United States
Department of
Agriculture

Soil
Conservation
Service

In cooperation with
Texas Agricultural
Experiment Station and
Texas State Soil and
Water Conservation
Board

Soil Survey of Harrison County, Texas

How To Use This Soil Survey

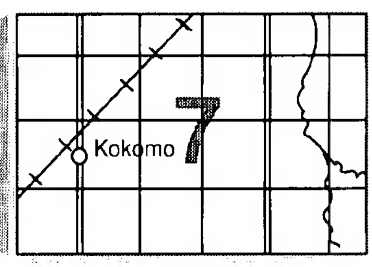
General Soil Map

The general soil map, which is the color map preceding the detailed soil maps, shows the survey area divided into groups of associated soils called general soil map units. This map is useful in planning the use and management of large areas.

To find information about your area of interest, locate that area on the map, identify the name of the map unit in the area on the color-coded map legend, then refer to the section **General Soil Map Units** for a general description of the soils in your area.

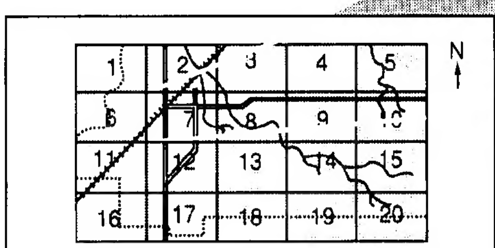
Detailed Soil Maps

The detailed soil maps follow the general soil map. These maps can be useful in planning the use and management of small areas.



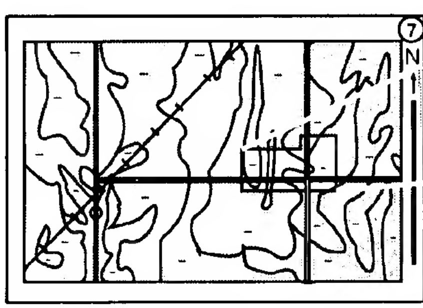
MAP SHEET

To find information about your area of interest, locate that area on the **Index to Map Sheets**, which precedes the soil maps. Note the number of the map sheet, and turn to that sheet.

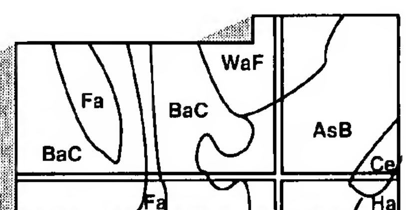


INDEX TO MAP SHEETS

Locate your area of interest on the map sheet. Note the map unit symbols that are in that area. Turn to the **Index to Map Units** (see Contents), which lists the map units by symbol and name and shows the page where each map unit is described.



MAP SHEET



AREA OF INTEREST

NOTE: Map unit symbols in a soil survey may consist only of numbers or letters, or they may be a combination of numbers and letters.

The **Summary of Tables** shows which table has data on a specific land use for each detailed soil map unit. See **Contents** for sections of this publication that may address your specific needs.

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Soil Conservation Service has leadership for the Federal part of the National Cooperative Soil Survey.

Major fieldwork for this soil survey was completed in 1988. Soil names and descriptions were approved in 1989. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1989. This soil survey was made cooperatively by the Soil Conservation Service, the Texas Agricultural Experiment Station, and the Texas State Soil and Water Conservation Board. It is part of the technical assistance furnished to the Harrison County Soil and Water Conservation District.

Soil maps in this survey may be copied without permission. Enlargement of these maps, however, could cause misunderstanding of the detail of mapping. If enlarged, maps do not show the small areas of contrasting soils that could have been shown at a larger scale.

All programs and services of the Soil Conservation Service are offered on a nondiscriminatory basis, without regard to race, color, national origin, religion, sex, age, marital status, or handicap.

Cover: An area of Caddo Lake in Harrison County. Baldcypress trees are in and around the lake.

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Issued October 1994

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Foreword

This soil survey contains information that can be used in land-planning programs in Harrison County. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

This soil survey is designed for many different users. Farmers, foresters, and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the survey to plan land use, select sites for construction, and identify special practices needed to ensure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are shallow to bedrock. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map. The location of each soil is shown on the detailed soil maps. Each soil in the survey area is described. Information on specific uses is given for each soil. Help in using this publication and additional information are available at the local office of the Soil Conservation Service or the Cooperative Extension Service.

Harry W. Oneth
State Conservationist
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Soil Survey of
Harrison County, Texas

By Micheal L. Golden, Alan C. Peer, and Samuel E. Brown, Jr.,
Soil Conservation Service

United States Department of Agriculture, Soil Conservation Service
in cooperation with
Texas Agricultural Experiment Station and Texas State Soil and Water Conservation Board

HARRISON COUNTY is in the northeastern part of Texas (fig. 1). Its eastern boundary is Caddo Parish, Louisiana. The county is irregularly shaped. It has an area of 914.2 square miles, or 585,082 acres, of which 4,898 acres is areas of water larger than 40 acres. These areas include Caddo Lake; the Sabine River; Big and Little Cypress Bayous; and Highland, Fern, and Shadowood Lakes. They also include Brandy Branch Reservoir and Fuguson, Tanyard, and Mason Creek Lakes, which are used for industrial purposes.

Marshall is the county seat. It is about 150 miles east of Dallas. The city of Longview extends into Harrison County. Other towns and communities are Waskom, Jonesville, Scottsville, Karnack, Uncertain, Woodlawn, Nesbitt, Harleton, and Hallsville. In 1980, the population of the county was about 55,500.

The elevation of Harrison County ranges from about 170 feet above sea level along the northern and southern boundaries to about 580 feet along the western boundary.

Harrison County is in the East Texas Timberlands Land Resource Area *(3)*. The topography generally is gently sloping but ranges from nearly level to steep. The county has a well defined drainage pattern and is dissected by many streams. The extreme northwest part of the county drains into Big Cypress Bayou and Lake O' The Pines. The north-central and western parts drain into Little Cypress Bayou and Caddo Lake. The northeastern part drains into Big Cypress Bayou and Caddo Lake. The southern part drains into the Sabine River. The extreme southeast part drains into the Red River.

The major farm enterprises in the county are timber and livestock production. About 51 percent of the county is managed as woodland; 22 percent as improved pasture or hayland; 14 percent as native pasture; and 13 percent as cropland, built up areas, recreational areas, wildlife habitat, urban land, or water areas.

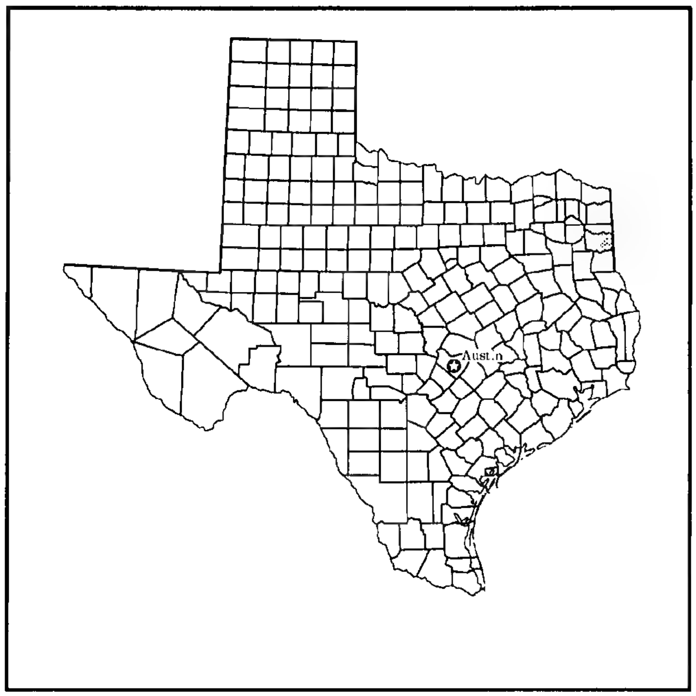

Figure 1.—Location of Harrison County in Texas.

The soils in the county formed mainly under forest vegetation. The soils in the uplands are light colored and have a dominantly loamy or sandy surface layer.

The soils on flood plains are loamy or clayey. They are mainly along the Sabine River, Little Cypress and Big Cypress Bayous, and the adjoining streams.

This soil survey updates the survey of Harrison County published in 1913 *(17)*. It provides additional information and has larger maps, which show the soils in greater detail.

General Nature of the County

This section provides general information about Harrison County. It describes history and population, agriculture, natural resources, and climate.

History and Population

Humans have inhabited the area now known as Harrison County for more than 12,000 years. This timespan includes four historical periods, or cultural episodes—the Paleo-Indian, 10,000 to 6000 B.C.; the Archaic, 6000 B.C. to A.D. 600; the Neo-American, A.D. 600 to 1680; and the Historic, 1680 to the present.

The inhabitants in the Paleo-Indian Period were hunters. They may have hunted large animals in the survey area during the late Pleistocene.

In the Archaic Period, the people had base camps, located on low terraces, to which they returned after hunting trips. They may have used seasonal campsites during these trips. Charcoal, fire-cracked rock, and projectile points have been discovered on archaeological sites. Evidence suggests that the people used the nuts from oak, hickory, and pecan forests.

The Neo-American Period is represented by the Caddoan culture, which is characterized by settled villages, advanced agricultural practices, and the use of pottery. The Caddoan houses varied in size and shape, though most were circular and had an extended entrance. The people grew maize, beans, and squash on the flood plains. Mound building was common. Artifacts of the Caddoan culture include points, darts, polished stone, and engraved ceramics.

In 1543, near the end of the Neo-American Period, Spanish explorers entered the survey area. Following the death of de Soto, Luis de Moscoso led a group that was attempting to return to Mexico. This group visited Caddo Indian villages and crossed Caddo Lake. In 1679, Spanish troops were stationed at Caddo Lake. They founded the town of Port Caddo. The town no longer exists.

The Historic Period is marked by the arrival of early settlers in the 1830's. The town of Marshall, the current county seat, has a rich history. It is named after John Marshall, who was Chief Justice of the United States Supreme Court from 1801 to 1835. During the period when Texas was a republic, prestigious homes were built in Marshall and cultural and educational events were common.

After the fall of Vicksburg during the Civil War, Marshall was the western capital of the Confederacy. It also was the temporary capital of the State of Missouri. The Governor of Missouri selected Marshall because of its stagecoach line to St. Louis and other cities. After the Civil War, when the Texas and Pacific Railroad provided transcontinental railway service to the West, Marshall became known as the "Gateway to Texas."

Twelve counties in Texas are named for men who once lived in Marshall. The town has also furnished the State with two governors.

Harrison County was established during a division of Shelby County in 1839. It originally included most of present-day Panola County and parts of Upshur and Marion Counties. It had an expanse of 1,500 square miles.

Harrison County was organized in 1842. The first county seat was at Greensborough, in an area 12 miles south of Marshall along the Sabine River. This site was abandoned because of mosquitoes and swamp fever. A new location, at Pulaski, also along the Sabine River, 23 miles southeast of Marshall, also proved to be unsatisfactory because of sanitation problems. Later that year, the county seat was moved to Marshall, which was farther inland and better drained.

In 1850, Harrison County was ranked first in the State in population and second in cotton production.

Harrison County is home to Claudia Alta "Lady Bird" Taylor Johnson, who grew up near the town of Karnack. She got the nickname "Lady Bird" at the age of about 2, when a maid said that she was as pretty as a lady bird. In 1934, she married Lyndon Baines Johnson.

Agriculture

Most of the early settlers in Harrison County were farmers. Cotton and corn were the main cash crops grown by the settlers. Over the years, peanuts, sugarcane, sweet potatoes, Irish potatoes, and grain sorghum also have been grown. Crop production has declined in recent years, and many old fields have been converted to improved pasture or planted to loblolly pine. Wheat, rye, peanuts, and other vegetable crops are grown on small farms and in gardens.

Most of the livestock in the county is raised in cow-calf enterprises. The livestock usually is pastured in summer and is fed hay and feed supplements in winter. The main pasture grasses are coastal bermudagrass, common bermudagrass, and bahiagrass, which also

provide hay for beef production. In many pastures overseeding cool-season legumes improves the soil and provides additional forage.

Commercial timber production is the basis for much of the economy in the county. Most of the woodland is on privately owned tracts. Several paper companies own and manage sizable tracts of woodland. Each year pine and hardwood timber is harvested for pulpwood, sawlogs, crossties, posts, and poles.

Natural Resources

Soil is the most important natural resource in Harrison County. The production of livestock, forage, crops, and timber all depend on the soil.

Oil and gas production is significant in Harrison County, which is part of the East Texas Oil Field. The numerous oil and gas wells in the county are sources of income for many landowners. Oil and gas exploration, drilling, and servicing provide opportunities for employment.

Sandy material suitable for a number of industrial and specialty purposes is deposited in the county. Principally quartz sand is mined on stream terraces along the Sabine River and in deep deposits of the Carrizo Sand and Queen City Sand Formations. Gravel is mined on gravelly ridges in areas of the Reklaw and Weches Formations. The sand and gravel are used mainly in construction.

Clay is mined in areas of Wilcox and Reklaw geologic material. Fired clay is used in the production of brick, pottery, tile, and fillers.

Land leased or sold for mining lignite coal has become increasingly important in the county. Lignite has been mined in the county for many years, first in underground shaft mines and later in open pits. The lignite is used in the production of activated carbon and is burned to generate electricity.

Water, fish, and wildlife are important natural resources in the county. Caddo Lake, Brandy Branch Reservoir, the Sabine River, Big and Little Cypress Bayous, and numerous smaller lakes, ponds, and creeks provide water for agricultural, industrial, recreational, and domestic uses. Fish and wildlife provide opportunities for recreation and income to the landowners of Harrison County.

Climate

Harrison County is hot in summer but cool in winter, when an occasional surge of cold air causes a sharp drop in otherwise mild temperatures. Rainfall is uniformly distributed throughout the year, reaching a slight peak in spring. Snowfalls are infrequent. The total annual precipitation is normally adequate for cotton, feed grain, and small grain.

Table 1 gives data on temperature and precipitation for the survey area as recorded at Marshall, Texas, in the period 1951 to 1984. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter, the average temperature is 46 degrees F and the average daily minimum temperature is 35 degrees. The lowest temperature on record, which occurred at Marshall on January 11, 1982, is 0 degrees. In summer, the average temperature is 81 degrees and the average daily maximum temperature is 92 degrees. The highest recorded temperature, which occurred at Marshall on August 13, 1962, is 110 degrees.

Growing degree days are shown in table 1. They are equivalent to "heat units." During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (50 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

The total annual precipitation is 46.9 inches. Of this, 23.5 inches, or about 50 percent, usually falls in April through September. The growing season for most crops falls within this period. In 2 years out of 10, the rainfall in April through September is less than 19 inches. The heaviest 1-day rainfall during the period of record was 6.95 inches at Marshall on December 3, 1982. Thunderstorms occur on about 44 days each year. Tornadoes and severe thunderstorms occur occasionally. These storms are local in extent and of short duration. They cause damage in scattered areas.

The average seasonal snowfall is 1.5 inches. The greatest snow depth at any one time during the period of record was about 6 inches. More than 1 inch of snow seldom accumulates. The number of days with snow accumulations of more than 1 inch varies greatly from year to year.

The average relative humidity in midafternoon is about 55 percent. Humidity is higher at night, and the average at dawn is about 80 percent. The sun shines 75 percent of the time possible in summer and 55 percent in winter. The prevailing wind is from the south. Average windspeed is highest, 13 miles per hour, in spring.

How This Survey Was Made

This survey was made to provide information about the soils in the survey area. The information includes a description of the soils and their location and a

discussion of the suitability, limitations, and management of the soils for specified uses. Soil scientists observed the steepness, length, and shape of slopes; the general pattern of drainage; the kinds of crops and native plants growing on the soils; and the kinds of bedrock. They dug many holes to study the soil profile, which is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material from which the soil formed. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

The soils in the survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil is associated with a particular kind of landscape or with a segment of the landscape. By observing the soils in the survey area and relating their position to specific segments of the landscape, a soil scientist develops a concept, or model, of how the soils were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. The system of taxonomic classification used in the United States is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

While a soil survey is in progress, samples of some of the soils in the area are generally collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot assure that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Map Unit Composition

A map unit delineation on a soil map represents an area dominated by one major kind of soil or an area dominated by two or three kinds of soil. A map unit is identified and named according to the taxonomic classification of the dominant soil or soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural objects. In common with other natural objects, they have a characteristic variability in their properties. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of soils of other taxonomic classes. Consequently, every map unit is made up of the soil or soils for which it is named and some soils that belong to other taxonomic classes. In the detailed soil map units, these latter soils are called inclusions or included soils.

In the general soil map units, they are called soils of minor extent.

Most inclusions have properties and behavioral patterns similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called similar (noncontrasting) inclusions. They are mentioned in the map unit descriptions. Other inclusions, however, have properties and behavior divergent enough to affect use or require different management. These are contrasting (dissimilar) inclusions. They generally occupy small areas and cannot be shown separately on the soil maps because of the scale used in mapping. The inclusions of contrasting soils are mentioned in the map unit descriptions. A few inclusions may not have been observed and consequently are not mentioned in the descriptions, especially where the soil pattern was so complex that it was impractical to make enough observations to identify all of the kinds of soils on the landscape.

The presence of inclusions in a map unit in no way diminishes the usefulness or accuracy of the soil data. The objective of soil mapping is not to delineate pure taxonomic classes of soils but rather to separate the landscape into segments that have similar use and management requirements. The delineation of such landscape segments on the map provides sufficient information for the development of resource plans, but onsite investigation is needed to plan for intensive uses in small areas.

General Soil Map Units

The general soil map at the back of this publication shows broad areas that have a distinctive pattern of soils, relief, and drainage. Each map unit on the general soil map is a unique natural landscape. Typically, it consists of one or more major soils and some minor soils. It is named for the major soils. The soils making up one unit can occur in another but in a different pattern.

The general soil map can be used to compare the suitability of large areas for general land uses. Areas of suitable soils can be identified on the map. Likewise, areas where the soils are not suitable can be identified.

Because of its small scale, the map is not suitable for planning the management of a farm or field or for selecting a site for a road or a building or other structure. The soils in any one map unit differ from place to place in slope, depth, drainage, and other characteristics that affect management.

1. Cuthbert-Bowie-Kirvin

Gently sloping to steep, moderately well drained and well drained, loamy soils; on uplands

The Cuthbert soils in this map unit are on strongly sloping to steep side slopes that are adjacent to streams and flood plains. The Bowie soils are on gently sloping, smooth stream divides, and the Kirvin soils are on low, oval hills and ridges. Drainage is mainly to the north and south, toward the Sabine River and Cypress Bayou. The underlying material is interbedded with weakly consolidated sandstone and shaly material of the Reklaw and Weches Formations. Slopes are dominantly 2 to 15 percent but range to 35 percent.

This unit makes up about 30 percent of the survey area. It is about 31 percent Cuthbert soils, 26 percent Bowie soils, 17 percent Kirvin soils, and 26 percent soils of minor extent (fig. 2).

Cuthbert soils are strongly sloping to steep and are well drained. Typically, the surface layer and subsurface layer are very dark grayish brown and light brown gravelly fine sandy loam. The upper part of the subsoil is yellowish red clay and clay loam mottled in shades of yellow. The lower part is mottled brownish yellow and yellowish red clay loam. The substratum is mottled brownish yellow, yellowish red, light gray, and strong brown, stratified, weakly consolidated sandstone and shaly material that has a texture of sandy clay loam. These soils are very strongly acid in the surface layer and subsurface layer and in the upper part of the subsoil and extremely acid in the lower part.

Bowie soils are gently sloping and moderately well drained. Typically, the surface layer and subsurface layer are dark brown and yellowish brown very fine sandy loam. The upper part of the subsoil is yellowish brown sandy clay loam and clay loam mottled in shades of red. The lower part is mottled strong brown, gray, yellowish brown, red, and dark red sandy clay loam. These soils are medium acid in the upper part and grade to very strongly acid in the lower part.

Kirvin soils are gently sloping to strongly sloping and are well drained. Typically, the surface layer and subsurface layer are dark brown and brown very fine sandy loam. The subsoil is dark red clay. It has strong brown mottles in the lower part. The substratum is mottled dark red and light brownish gray silty clay loam and silty clay. These soils are slightly acid in the surface layer and subsurface layer and very strongly acid in the subsoil and substratum.

Of minor extent in this unit are the Darbonne, Iuka, Lilbert, Sacul, Sawyer, Warnock, and Wolfpen soils. Darbonne soils are on gently sloping knolls and side slopes. Iuka soils are on flood plains along small streams. Lilbert, Warnock, and Wolfpen soils are on hills and side slopes along streams in areas of Carrizo Sand or Queen City Sand. They have a sandy surface layer. Sacul and Sawyer soils are on slightly concave hill slopes, flats, and toe slopes.

Most areas of this unit are used as pasture or woodland. A few areas are used as cropland.

The native woodland in areas of these soils supports mixed hardwoods and pine. Loblolly pine and shortleaf pine are the principal trees. Species of oak, elm, hickory, and gum, however, are common. This unit is well suited to the production of pine, but erosion and the equipment limitation are problems on the steeper soils. Proper woodland management can increase timber production.

The main pasture grasses on these soils are coastal

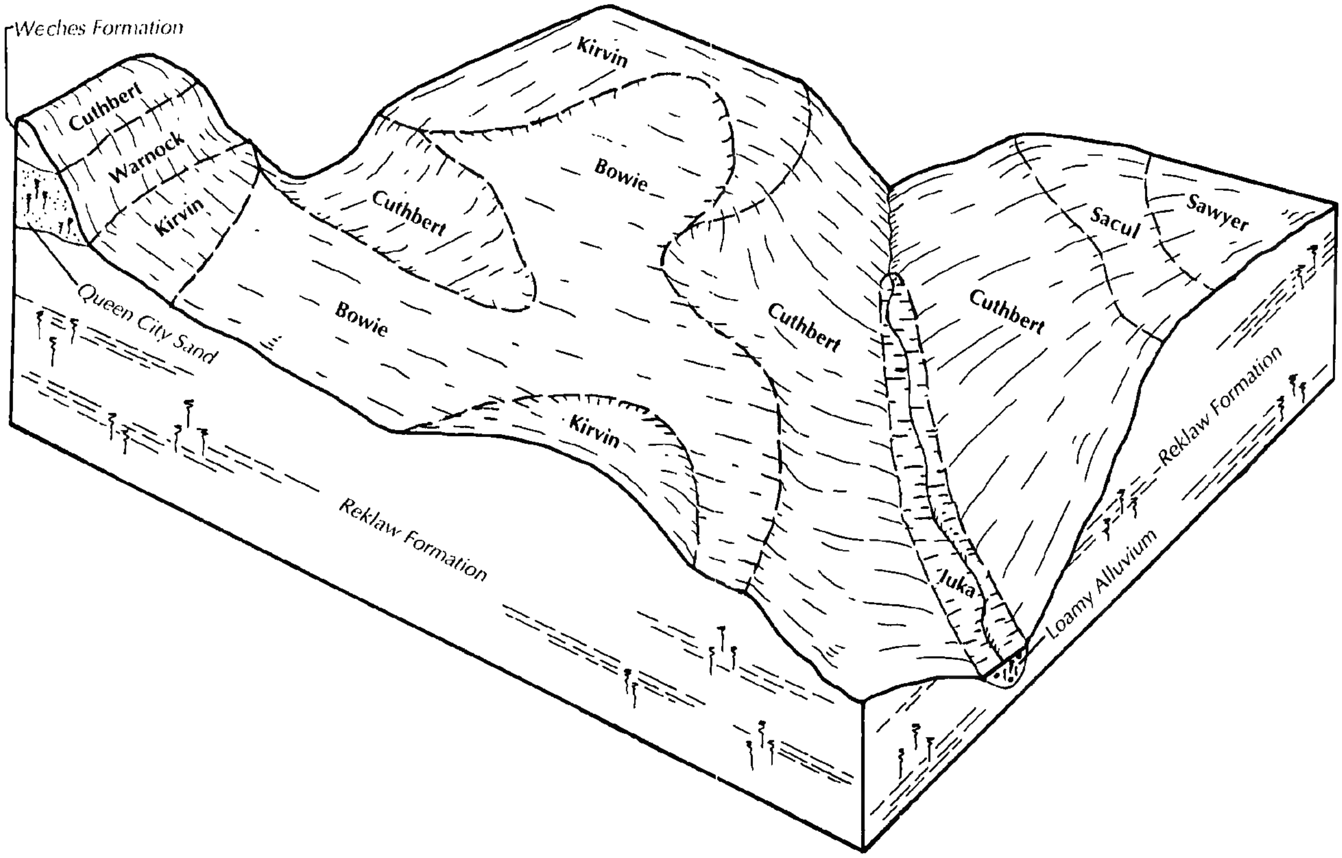

Figure 2.—Pattern of soils and parent material in the Cuthbert-Bowie-Kirvin general soil map unit.

bermudagrass, common bermudagrass, and bahiagrass. In many pastured areas overseeding of crimson clover or arrowleaf clover has increased forage production. Wheat, oats, and ryegrass are planted in a few small areas for winter grazing. Forage yields are high if good management is applied. Applications of fertilizer and lime are essential for high yields.

A few areas of these soils are used for corn, peas, or grain sorghum. Applications of lime and fertilizer are needed for good yields.

These soils are limited as sites for some urban uses. Coating underground steel pipe helps to prevent corrosion. Properly designing roads and structures helps to compensate for the slope and the shrinking and swelling of the clayey subsoil. Properly designing septic tank absorption fields helps to overcome the slope and slow permeability in the subsoil.

2. Scottsville

Nearly level, moderately well drained, loamy soils; on uplands

This map unit typically is on broad, smooth interstream divides; on low, smooth foot slopes; in slightly concave areas; and at the head of drainageways. Drainage is mainly to the north, east, and south, toward the Red River and the Sabine River. This unit has a thin veneer of loamy sediments over clayey material. The underlying material is weakly consolidated siltstone and shale of the Wilcox Group. Slopes are 0 to 2 percent.

This unit makes up about 24 percent of the survey area. It is about 61 percent Scottsville soils and 39 percent soils of minor extent (fig. 3).

Typically, the surface layer and subsurface layer of the Scottsville soils are dark brown and yellowish brown very fine sandy loam. The upper part of the subsoil is yellowish brown loam and clay loam mottled in shades of red, brown, and gray. The lower part is light brownish gray and light gray clay mottled in shades of red and brown. These soils are strongly acid in the upper part and very strongly acid in the lower part.

Of minor extent in this unit are the Cart, Eastwood, Guyton, Iuka, Latex, Metcalf, and Sardis soils. Cart soils are on mounds. They are associated with Guyton and Metcalf soils, which are on slightly concave flats. Eastwood soils are on gently sloping to moderately

steep side slopes adjacent to drainageways. Iuka and Sardis soils are on flood plains. Latex soils are on the slightly higher convex hilltops.

Most areas of this unit are used as pasture or woodland. A few areas are used as cropland.

The native woodland in areas of these soils supports mixed hardwoods and pine. Loblolly pine and shortleaf pine are the principal commercial trees. Species of oak, elm, hickory, and gum, however, are common. Wetness is a problem during the winter. It limits the use of equipment. Proper woodland management can increase timber production.

The main pasture grasses on these soils are coastal bermudagrass, common bermudagrass, and bahiagrass. In many pastured areas overseeding of crimson clover or arrowleaf clover has increased forage production. Wheat, oats, and ryegrass are planted in a few small areas for winter grazing. Forage yields are high if good management is applied. Applications of fertilizer and lime are essential for high yields.

A few areas of these soils are used for corn, peas, or grain sorghum. Applications of lime and fertilizer are needed for good yields.

These soils are limited as sites for some urban uses. Coating underground steel pipe helps to prevent corrosion. Properly designing roads and structures helps to compensate for the wetness and the shrinking and swelling of the clayey subsoil. Properly designing septic tank absorption fields helps to overcome the wetness and very slow permeability in the subsoil.

3. Lilbert-Warnock-Wolfpen

Gently sloping to moderately steep, moderately well drained and well drained, sandy soils; on uplands

This map unit typically is on broad, sandy ridges, divides, and side slopes. The drainage pattern is poorly defined on the ridges and divides, but it is well defined below the side slopes. Most rainfall enters the surface layer. Seeps and springs are along the lower edges of the side slopes. Small drainageways extend from the ridges and divides in all directions but eventually enter

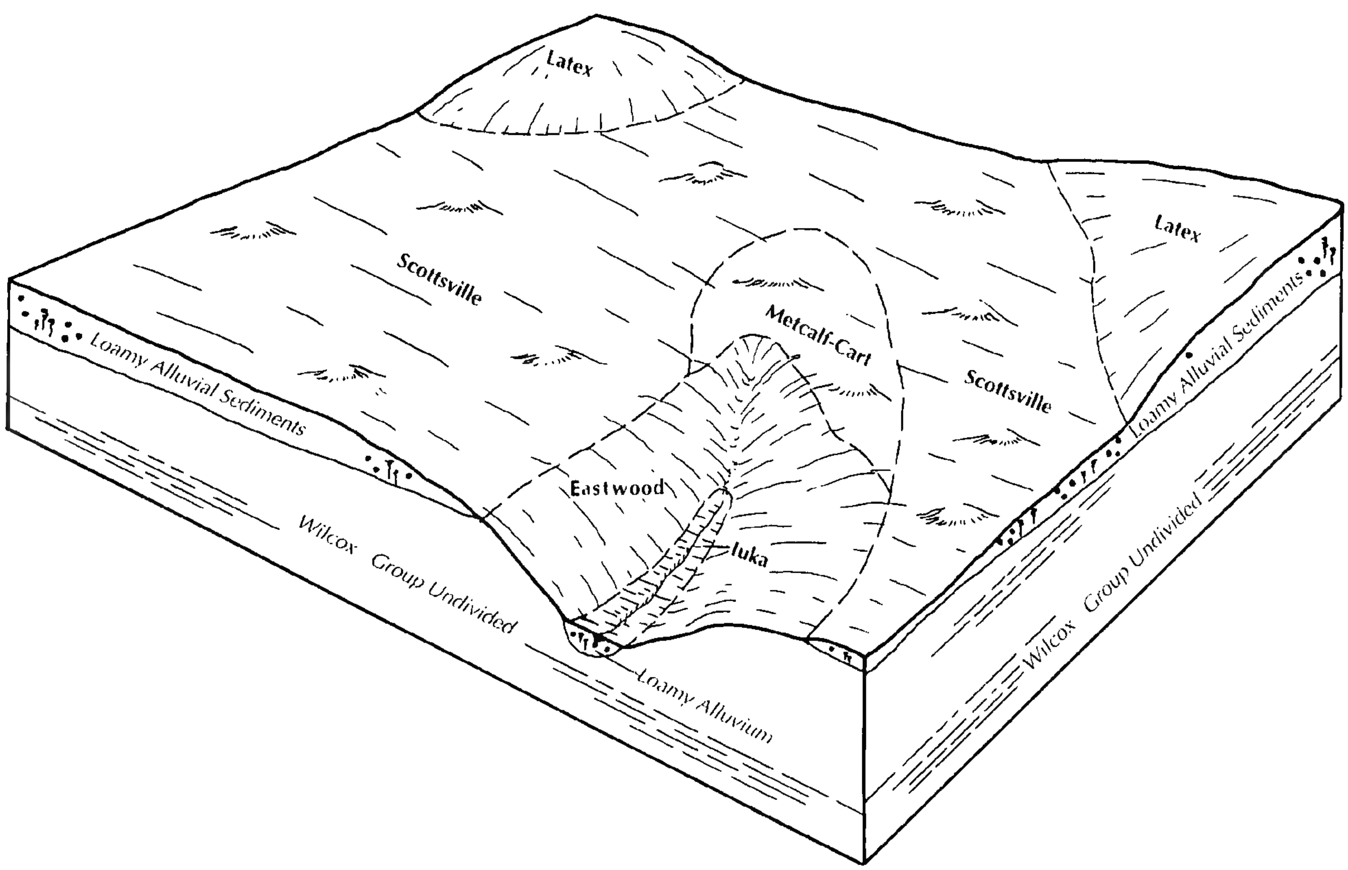

Figure 3.—Pattern of soils and parent material in the Scottsville general soil map unit.

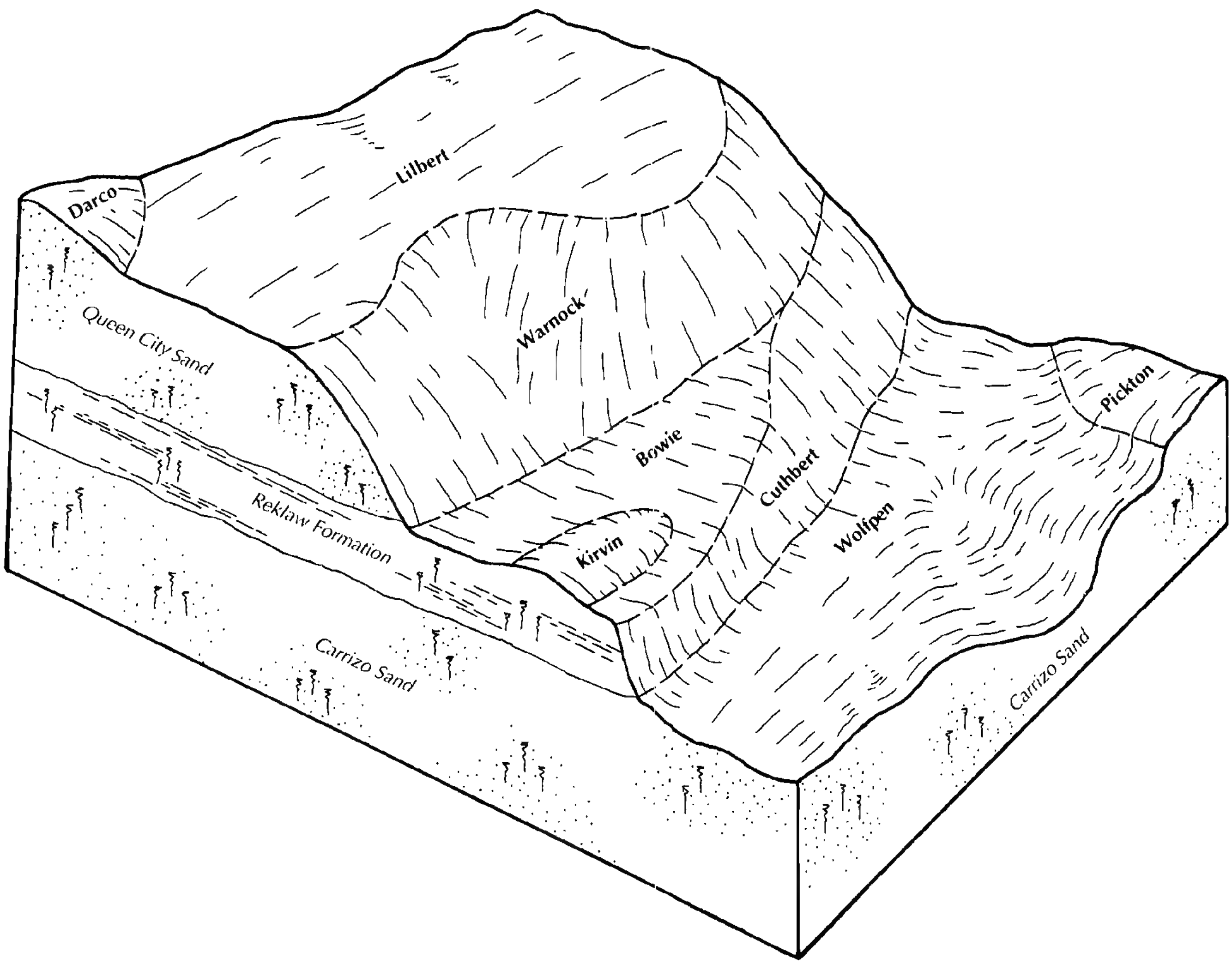

Figure 4.—Pattern of soils and parent material in the Lilbert-Warnock-Wolfpen general soil map unit.

creeks generally flowing southerly and northerly. The underlying material is interbedded with weakly consolidated, sandy and loamy Queen City Sand, Carrizo Sand, and remnants of Sparta Sand, which are sandy members of the Claiborne Group. Slopes are 2 to 15 percent.

This unit makes up about 13 percent of the survey area. It is about 21 percent Lilbert soils and the similar Darco soils, 20 percent Warnock soils, 19 percent Wolfpen soils and the similar Pickton soils, and 40 percent soils of minor extent (fig. 4).

Lilbert soils are gently sloping and moderately well drained. Typically, the surface layer and subsurface layer are dark brown and light yellowish brown loamy fine sand. The subsoil is yellowish brown sandy clay loam. It has mottles in shades of red and yellowish red nodules in the lower part. These soils are strongly acid in the surface layer and subsurface layer and range from medium acid in the upper part of the subsoil to very strongly acid in the lower part of the subsoil.

Warnock soils are strongly sloping to moderately steep and are moderately well drained. Typically, the surface layer and subsurface layer are dark yellowish brown and yellowish brown loamy fine sand. The upper part of the subsoil is yellowish brown fine sandy loam and sandy clay loam mottled in shades of red. The lower part is mottled brownish yellow and red sandy clay loam. It has mottles in shades of gray and brown. These soils are strongly acid in the surface layer and subsurface layer and grade to very strongly acid in the lower part.

Wolfpen soils are gently sloping to moderately steep

and are well drained. Typically, the surface layer and subsurface layer are dark brown, very pale brown, and brown loamy fine sand. The upper part of the subsoil is light yellowish brown and brownish yellow sandy clay loam and fine sandy loam mottled in shades of brown. The lower part is mottled light gray, reddish yellow, and pale brown fine sandy loam. It has mottles in shades of yellow. These soils are medium acid in the surface layer and subsurface layer and grade to strongly acid in the lower part.

Of minor extent in this unit are the Bernaldo, Bowie, Cuthbert, Darco, Darden, Kirvin, and Pickton soils. Bernaldo and Bowie soils are on the lower shoulder slopes and toe slopes. Cuthbert soils are on side slopes. Darco, Darden, Kirvin, and Pickton soils are in landscape positions similar to those of the major soils or are on convex ridgetops.

Most areas of this unit are used as pasture or woodland.

The native woodland in areas of these soils supports mixed hardwoods and pine. Loblolly pine and shortleaf pine are the principal trees. Species of oak, hickory, and gum, however, are common. This unit is well suited to the production of pine, but erosion and the equipment limitation are problems on the steeper soils. Proper woodland management can increase timber production.

The main pasture grasses on these soils are coastal bermudagrass, common bermudagrass, lovegrass, and bahiagrass. In many pastured areas overseeding of crimson clover or arrowleaf clover has increased forage production. Wheat, oats, and ryegrass are planted in a few small areas for winter grazing. Forage yields are high if good management is applied. Applications of fertilizer and lime are essential for high yields.

These soils are limited as sites for some urban uses. Coating underground steel pipe helps to prevent corrosion. Properly designing roads and structures helps to compensate for the slope. Properly designing septic tank absorption fields helps to overcome the slope and rapid permeability in the topsoil. Droughtiness in the topsoil hinders the establishment and maintenance of lawns.

4. Iuka-Socagee-Sardis

Nearly level, moderately well drained to poorly drained, loamy soils; on bottom land

This map unit typically is on nearly level flood plains along streams in all parts of the county. The soils are subject to flooding and are wet for extended periods. They formed in recent loamy sediments derived from nearby sources, mostly of the Claiborne or Wilcox Groups. Slopes are 0 to 1 percent.

This map unit makes up about 11 percent of the county. It is about 32 percent Iuka soils, 15 percent Socagee soils, 15 percent Sardis soils, and 38 percent soils of minor extent.

Iuka soils are moderately well drained and generally are along the smaller streams, near headwaters. Typically, the surface layer is mottled dark grayish brown and dark yellowish brown fine sandy loam. The upper part of the subsoil is strong brown and brownish yellow fine sandy loam mottled in shades of brown. The next part is gray and light brownish gray silt loam mottled in shades of brown. It has a few strata of loamy fine sand. The lower part is mottled gray, light brownish gray, light yellowish brown, and strong brown silt loam. The substratum is brownish and grayish loamy fine sand. These soils are strongly acid or very strongly acid throughout.

Socagee soils are poorly drained and are along the larger streams. Typically, the surface layer and the upper part of the subsoil are gray silty clay loam mottled in shades of brown. The lower part of the subsoil is light gray, grayish brown, and light brownish gray clay loam mottled in shades of brown and yellow. The substratum is light brownish gray loam mottled in shades of yellow and brown. These soils are very strongly acid in the surface layer and in the upper part of the subsoil and extremely acid in the lower part of the subsoil and in the substratum.

Sardis soils are somewhat poorly drained and are along the larger streams. Typically, the surface layer and the upper part of the subsoil are dark grayish brown and brown loam mottled in shades of brown and gray. The lower part is light brownish gray and gray silty clay loam mottled in shades of brown, red, and yellow. These soils generally are very strongly acid, but the lower part of the subsoil is medium acid.

Of minor extent in this unit are the Bibb, Bienville, Cuthbert, Cypress, Mantachie, Mathiston, and Mooreville soils. Bibb, Mantachie, Mathiston, and Mooreville soils are on flood plains. Bienville soils are on sandy, low terraces. Cuthbert soils are on sloping side slopes. Cypress soils are near Cypress Bayou and are wetter than the major soils. Also, they are wet for longer periods.

Most areas are used as woodland or pasture.

The native woodland in areas of these soils supports hardwoods and pine. Water oak is the most common tree species on the wetter sites, and loblolly pine and shortleaf pine grow in areas of the slightly better drained soils. Some problems affect the production of hardwoods and pine. Flooding and the seasonal high water table increase the seedling mortality rate. The use of harvesting equipment is usually restricted to summer.

The main pasture grasses on these soils are tall fescue, bahiagrass, and Dallisgrass. Legumes, such as white clover and singletary peas, grow well. Applications of fertilizer and lime are needed for sustained yields. Wetness and the hazard of flooding are management concerns in pastured areas.

Because of flooding and wetness, these soils are not suitable as homesites.

5. Eastwood

Gently sloping to moderately steep, moderately well drained, loamy soils; on uplands

This map unit typically is on side slopes adjacent to streams and flood plains and on oval hills or ridges. Drainage is mainly to the north and south, toward the Sabine River and Cypress Bayou. The underlying material is weakly consolidated siltstone and shale of the Wilcox Group. Slopes are 1 to 20 percent.

This unit makes up about 10 percent of the survey area. It is about 65 percent Eastwood soils and 35 percent soils of minor extent.

Typically, the surface layer and subsurface layer of the Eastwood soils are dark yellowish brown and light yellowish brown very fine sandy loam. The upper part of the subsoil is red clay mottled in shades of gray. The next part is red and yellowish brown silty clay mottled in shades of gray and red. The lower part is light yellowish brown and yellowish brown silty clay loam and loam mottled in shades of gray and yellow. The substratum is light yellowish brown, weakly consolidated siltstone that has a texture of silty clay loam and has yellowish mottles. These soils are very strongly acid in the surface layer, subsurface layer, and subsoil and are neutral in the substratum.

Of minor extent in this unit are the Iuka, Mathiston, Metcalf, Meth, Sardis, Scottsville, and Wolfpen soils. Iuka, Mathiston, and Sardis soils are on flood plains. Metcalf and Scottsville soils are on nearly level to gently sloping flats at the head of streams and on narrow finger divides that dip toward side slopes. Meth soils are on the higher knolls. The sandy Wolfpen soils are on the upper side slopes in areas of Carrizo Sand.

Most areas of this unit are used as woodland. Some areas are used as pasture. The unit generally is not used for crops.

The native woodland in areas of these soils supports mixed hardwoods and pine. Loblolly pine and shortleaf pine are the principal commercial trees. Species of oak, elm, hickory, and gum, however, are common. The use of equipment may be limited because of the slope. Proper woodland management can increase timber production.

The main pasture grasses on these soils are coastal bermudagrass, common bermudagrass, and bahiagrass. In many pastured areas overseeding of crimson clover or arrowleaf clover has increased forage production. Wheat, oats, and ryegrass are planted in a few small areas for winter grazing. Forage yields are high if good management is applied. Applications of fertilizer and lime are essential for high yields.

These soils are limited as sites for some urban uses. Coating underground steel pipe helps to prevent corrosion. Properly designing roads and structures helps to compensate for the slope and the shrinking and swelling of the clayey subsoil. Properly designing septic tank absorption fields helps to overcome slow permeability in the subsoil.

6. Bernaldo

Very gently sloping, well drained, loamy soils; on terraces

This map unit typically is on broad, very gently sloping terraces and high terrace remnants. The drainage pattern is poorly defined. The underlying material is ancient, loamy, fluviatile terrace sediments and reworked Carrizo Sand of the Claiborne Group. The terraces are 25 to 200 feet above the present-day flood plains. Slopes are 1 to 3 percent.

This unit makes up about 7 percent of the survey area. It is about 72 percent Bernaldo soils and 28 percent soils of minor extent.

Typically, the surface layer and subsurface layer of the Bernaldo soils are dark brown and yellowish brown fine sandy loam. The upper part of the subsoil is brown, strong brown, and yellowish brown loam mottled in shades of red. The lower part is brownish yellow and strong brown loam mottled in shades of red, gray, and yellow. These soils are medium acid to very strongly acid throughout, except for the surface layer in limed areas.

Of minor extent in this unit are the Bowie, Cart, Elrose, Erno, Latex, and Scottsville soils. Bowie soils are on the slightly higher uplands in areas of the Reklaw Formation of the Claiborne Group. Cart and Erno soils are on terraces. Elrose soils are in the slightly higher areas, generally at the contact of Carrizo Sand of the Claiborne and Wilcox Groups. Latex and Scottsville soils are generally on the slightly higher uplands in areas of the Wilcox Group.

Most areas of this unit are used as pasture or woodland. A few areas are used as cropland.

The native woodland in areas of these soils supports mixed hardwoods and pine. Loblolly pine is the principal commercial tree. Species of oak, elm, hickory, and gum, however, are common. This unit is well suited to woodland. No major limitations affect timber production.

Proper woodland management can increase timber production.

The main pasture grasses on these soils are coastal bermudagrass, common bermudagrass, and bahiagrass. In many pastured areas overseeding of crimson clover or arrowleaf clover has increased forage production. Wheat, oats, and ryegrass are planted in a few small areas for winter grazing. Forage yields are high if good management is applied. Applications of fertilizer and lime are essential for high yields.

A few areas of these soils are used for corn, peas, or grain sorghum. Applications of lime and fertilizer are needed for good yields.

These soils are suited to most urban uses. They should be strengthened, however, if used as sites for roads or structures. Coating underground steel pipe helps to prevent corrosion.

7. Estes-Mooreville

Nearly level, moderately well drained and somewhat poorly drained, loamy and clayey soils; on bottom land

This map unit typically is on nearly level flood plains along the Sabine River. The soils formed in recent clayey sediments derived from sources upriver, outside the county. Slopes are 0 to 1 percent.

This map unit makes up about 2 percent of the county. It is about 37 percent Estes soils, 31 percent Mooreville soils and the similar Mantachie soils, and 32 percent soils of minor extent.

Estes soils are somewhat poorly drained. Typically, the surface layer and the upper part of the subsoil are dark brown and pale brown clay mottled in shades of red. The lower part of the subsoil is light brownish gray clay mottled in shades of red and brown. The substratum is light brownish gray clay loam mottled in shades of yellow and red. These soils are extremely acid throughout.

Mooreville soils are moderately well drained and are slightly higher on the landscape than the Estes soils and are nearer the stream channels. Typically, the surface layer and the upper part of the subsoil are dark brown and yellowish brown loam mottled in shades of gray, yellow, and brown. The lower part of the subsoil is gray loam mottled in shades of red and brown. These soils are very strongly acid throughout.

Of minor extent in this unit are the Bienville, Eastwood, Iuka, and Nugent soils. Bienville soils are on low terraces. Eastwood soils are on side slopes in the uplands. Iuka soils are along feeder streams that drain into areas of the unit. Nugent soils are on point bars next to the river.

Most areas of this unit are used as woodland, wildlife habitat, or pasture.

The native woodland in areas of these soils supports hardwoods and pine. Water oak is the most common tree. Loblolly pine and shortleaf pine grow in areas of the slightly better drained soils. Some problems affect the production of hardwoods and pine. Flooding and the seasonal high water table increase the seedling mortality rate. The use of harvesting equipment is usually restricted to summer.

The main pasture grasses on these soils are tall fescue, bahiagrass, and Dallisgrass. Legumes, such as white clover and singletary peas, grow well. Applications of fertilizer and lime are needed for sustained yields. Wetness and the hazard of flooding are management concerns in pastured areas.

Because of flooding and wetness, these soils are not suitable as homesites.

8. Latch-Mollville

Nearly level, moderately well drained and poorly drained, sandy and loamy soils; on terraces

The Latch soils in this map unit are on low, oblong, sandy terraces. The Mollville soils are on low, wet, slightly depressional, loamy terraces. They are between areas of the Latch soils on oblong mounds. The mounds are slightly higher than the concave, low areas. The underlying material is sandy, fluviatile terrace deposits derived from local sources. The surface has been partly reworked by the wind. The terraces are 10 to 50 feet above the present-day flood plains. Slopes are 0 to 1 percent.

This unit makes up about 2 percent of the survey area. It is about 40 percent Latch soils and the similar Bienville soils, 19 percent Mollville soils and the similar Guyton soils, and 41 percent soils of minor extent.

Latch soils are moderately well drained. Typically, the surface layer and subsurface layer are dark brown and yellowish brown loamy fine sand. The subsoil is yellowish brown sandy clay loam mottled in shades of red and brown. The substratum is brownish yellow loamy fine sand and fine sand mottled in shades of brown. These soils are very strongly acid or strongly acid throughout.

Mollville soils are poorly drained. Typically, the surface layer and subsurface layer are dark grayish brown and grayish brown loam mottled in shades of brown. The subsoil is grayish brown and light brownish gray loam or clay loam mottled in shades of brown. The substratum is light brownish gray loamy fine sand. These soils are very strongly acid throughout.

Of minor extent in this unit are the Bernaldo, Cart, Erno, and Iuka soils. Bernaldo soils are on the slightly higher terraces and are well drained. Cart and Erno

soils are on mounds. Iuka soils are in frequently flooded areas.

Most areas of this unit are used as pasture or woodland.

The native woodland in areas of these soils supports mixed hardwoods and pine. Loblolly pine and shortleaf pine are the principal commercial trees.

The main pasture grasses on these soils are bahiagrass, common bermudagrass, coastal bermudagrass, and tall fescue. Overseeding of white clover or singletary peas has increased forage production. Applications of fertilizer and lime are essential for high yields.

A few areas of the Latch soils are used for horticultural crops. Applications of fertilizer and lime improve yields.

Several limitations affect urban uses. A high water table and moderately slow permeability keep septic tank absorption fields from operating satisfactorily. Proper design and careful installation of structures can help to overcome the limitations.

9. Pirkey-Marklake

Gently sloping to moderately steep, well drained, reconstructed, loamy soils; on uplands

This map unit typically is in reclaimed areas that formerly were strip-mined for lignite. It has been restructured and has remnants of native soils. The source material is derived from the Reklaw Formation and Carrizo Sand of the Claiborne Group, from the Wilcox Group, and from fluviatile terrace deposits. Slopes are 1 to 20 percent.

This unit makes up about 1 percent of the survey area. It is about 41 percent Pirkey soils, 14 percent Marklake soils, and 45 percent soils of minor extent.

Pirkey soils are gently sloping to strongly sloping. Typically, the surface layer is brown very fine sandy loam. The subsoil is yellowish brown, brownish yellow, and strong brown sandy clay loam having soil fragments in shades of yellow and red. It generally has no lignite partings. The substratum is very dark gray clay loam having mixed soft shaly material that has a texture of loam to clay. It has lignite partings. These soils are slightly acid in the surface layer, are very strongly acid in the subsoil, and grade to ultra acid in the substratum.

Marklake soils are gently sloping to moderately steep. Typically, the surface layer is dark brown fine sandy loam. The upper part of the subsoil is yellowish brown, dark grayish brown, and brown sandy clay loam and fine sandy loam having soil fragments in shades of yellow and brown. The lower part is light brownish gray clay loam having soil fragments in shades of brown and yellow. Lignite fragments and partings may be throughout the profile. These soils are strongly acid or very strongly acid throughout.

Of minor extent in this unit are the Bernaldo, Bowie, Cart, Cuthbert, Erno, Iuka, and Kirvin soils. Bernaldo, Bowie, Cart, and Erno soils are on slightly convex flats. Cuthbert soils are on side slopes adjacent to streams and flood plains. Iuka soils are on flood plains along small streams. Kirvin soils are on low, oval hills and ridges. All of the minor soils are in remnant areas that have not been disturbed by mining activities.

Most areas of this unit are used as hayland or woodland.

The main commercial tree planted on these soils is loblolly pine. A few areas support volunteer species of hardwoods, such as oaks, elm, hickory, and gum. This unit is well suited to the production of pine, but erosion and the equipment limitation are problems in the steeper areas. Proper woodland management can increase timber production.

The main pasture grasses on these soils are coastal bermudagrass, common bermudagrass, and bahiagrass. In many pastured areas overseeding of crimson clover or arrowleaf clover has increased forage production. Wheat, oats, and ryegrass are planted in a few small areas for winter grazing. Forage yields are high if good management is applied. Applications of fertilizer and lime are essential for high yields.

These soils are limited as sites for some urban uses. Coating underground steel pipe helps to prevent corrosion. Properly designing roads and structures helps to compensate for the slope and the shrinking and swelling of the clayey subsoil. Properly designing septic tank absorption fields helps to overcome slow permeability in the subsoil. The soils may have unstable fill because of the backfilling of dragline pits.

Detailed Soil Map Units

The map units on the detailed soil maps at the back of this survey represent the soils in the survey area. The map unit descriptions in this section, along with the soil maps, can be used to determine the suitability and potential of a soil for specific uses. They also can be used to plan the management needed for those uses. More information on each map unit, or soil, is given under the heading "Use and Management of the Soils."

Each map unit on the detailed soil maps represents an area on the landscape and consists of one or more soils for which the unit is named.

A symbol identifying the soil precedes the map unit name in the soil descriptions. Each description includes general facts about the soil and gives the principal hazards and limitations to be considered in planning for specific uses.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer or of the substratum, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer or of the substratum. They also can differ in slope, stoniness, salinity, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Kirvin very fine sandy loam, 2 to 5 percent slopes, is a phase of the Kirvin series.

Some map units are made up of two or more major soils. These map units are called soil complexes. A *soil complex* consists of two or more soils in such an intricate pattern or in such small areas that they cannot be shown separately on the soil maps. The pattern and proportion of the soils are somewhat similar in all areas. Latch-Mollville complex, 0 to 1 percent slopes, is an example.

Most map units include small scattered areas of soils other than those for which the map unit is named. Some of these included soils have properties that differ substantially from those of the major soil or soils. Such differences could significantly affect use and management of the soils in the map unit. The included soils are identified in each map unit description. Some small areas of strongly contrasting soils are identified by a special symbol on the soil maps.

This survey includes *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Urban land is an example. Miscellaneous areas are shown on the soil maps. Some that are too small to be shown are identified by a special symbol on the soil maps.

Table 4 gives the acreage and proportionate extent of each map unit. Other tables (see "Summary of Tables") give properties of the soils and the limitations, capabilities, and potentials for many uses. The "Glossary" defines many of the terms used in describing the soils.

BaB—Bernaldo fine sandy loam, 1 to 3 percent slopes. This very gently sloping soil is mainly on stream terraces about 10 to 20 feet higher than the current flood plains. It also is on remnants of older terraces on upland stream divides and side slopes that are as high as 25 to 200 feet above the flood plains. The surface is plane or weakly convex. Individual areas range from 15 to 1,000 acres in size and average about 100 acres.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 3 inches, slightly acid, dark brown fine sandy loam

Subsurface layer:

3 to 11 inches, medium acid, yellowish brown fine sandy loam

Subsoil:

11 to 17 inches, medium acid, brown loam

17 to 26 inches, medium acid, strong brown loam

26 to 43 inches, strongly acid, yellowish brown loam that has yellowish red and strong brown mottles

43 to 62 inches, strongly acid, yellowish brown loam

that has strong brown and red mottles and has vertical streaks of pale brown sand
62 to 80 inches, very strongly acid, brownish yellow loam that has red and light brownish gray mottles and has vertical streaks of pale brown fine sand
80 to 95 inches, very strongly acid, strong brown loam that has light brownish gray, brownish yellow, and yellowish red mottles

Important soil properties—

Available water capacity: high
Permeability: moderate
Drainage: well drained (the surface dries quickly after rains)
Runoff: slow
Water table: at a depth of about 4 to 6 feet during winter and below a depth of 6 feet during the rest of the year
Root zone: very deep
Shrink-swell potential: moderate in the subsoil
Hazard of water erosion: slight (K factor—.28; T factor—a maximum allowance of 5 tons per acre per year)
Prime farmland: yes (all the soil properties meet the criteria)

Included with this soil in mapping are small areas of Cart, Eastwood, Elrose, Erno, Guyton, Latex, Meth, Scottsville, and Wolfpen soils. Cart and Erno soils are loamy in the upper part of the subsoil and are brittle in the lower part of the subsoil. They are in the slightly lower mounded areas. Eastwood soils have a red to gray, clayey subsoil. They are on gently sloping to moderately steep side slopes. Elrose soils have a red, loamy subsoil. They are in the slightly higher convex areas. Guyton soils have a dominantly gray, loamy subsoil. They are poorly drained and are on concave flats and in old oxbow drainageways. Meth soils have a red, clayey subsoil. They are in the higher convex areas. Latex and Scottsville soils are loamy in the upper part of the subsoil and are clayey in the lower part of the subsoil. They generally are in the slightly higher landscape positions. Wolfpen soils have a sandy surface layer that is 20 to 40 inches thick. They are in the slightly higher landscape positions.

The contrasting Eastwood, Guyton, Meth, Scottsville, and Wolfpen soils make up less than 5 percent of the map unit. The other included soils are similar to the Bernaldo soil and make up less than 15 percent of the map unit.

Areas of the Bernaldo soil are used mainly as woodland or pasture. A few areas are used for nonirrigated crops or for homesite development.

The wooded areas support hardwoods and pine. The commercial trees used for timber production are loblolly pine, slash pine, and shortleaf pine. Yields of loblolly pine are 370 board feet per acre per year over a 50-year period. Based on a 50-year site curve, the mean site index is 94 for loblolly pine and 84 for shortleaf pine.

Reforestation in cutover areas of loblolly pine and shortleaf pine occurs naturally where seed trees are in the stand. Reforestation also can be achieved by planting loblolly pine seedlings. When openings are made in the canopy, invading brush species that are not controlled can delay the establishment or regeneration of pine. Selective thinning, removal of undesirable trees, and protection from wildfire increase yields.

This soil is well suited to timber. No major limitations affect timber production. Using standard equipment that has wheels or tracks causes rutting and compaction when the soil is moist and displacement of the surface layer when the soil is dry. Puddling can occur during wet periods, making unsurfaced roads and skid trails slick and almost impassable.

Using low-pressure ground equipment minimizes soil damage and erosion and helps to maintain productivity. The proper design and careful construction of haul roads and care in the selection of sites for culverts and turnouts help to control erosion. Skid trails, firebreaks, and other areas where the surface is disturbed are subject to rilling and gullying. Revegetating the spoil from excavations reduces the hazard of rill and gully erosion.

This soil is well suited to pasture grasses for grazing or hay. No major limitations affect these uses. The most commonly grown pasture grasses are bahiagrass, common bermudagrass, and coastal bermudagrass. Low inherent soil fertility is a limitation. Applications of fertilizer and lime and controlled grazing improve yields. Cool-season legumes, such as vetch and arrowleaf clover, provide winter forage and add nitrogen to the soil.

The main suitable crops grown on this soil are corn, grain sorghum, and truck crops, such as peas. Where the plant cover is inadequate, erosion is a hazard. Conservation tillage, terraces, and contour farming help to prevent excessive erosion. Crop growth may be limited by an insufficient amount of water during dry periods in summer. The soil is suited to several kinds of horticultural crops. Crop residue management is needed to maintain the content of organic matter and improve tilth. The soil can be tilled throughout a wide range in moisture content. Applications of lime and fertilizer improve yields.

This soil is suited to most urban uses. Proper design and careful installation are needed to overcome seasonal wetness on sites for septic tank absorption fields and for dwellings with basements and seepage in pond reservoir areas. The soil should be strengthened

when it is used as base material for local roads and streets. Properly designing foundations helps to overcome the moderate shrink-swell potential in the subsoil. Treating concrete minimizes corrosion.

This soil is well suited to recreational uses and provides habitat for many wildlife species. Whitetail deer, bobwhite quail, mourning dove, many songbirds, and other small animals feed in the open pastures and fields. They benefit from the security of the surrounding woodland cover.

The capability subclass is 2e. The woodland ordination symbol is 10A.

Bb—Bibb silt loam, frequently flooded. This nearly level soil is on flood plains along small streams. The surface is plane or weakly concave. Slopes are 0 to 1 percent. Individual areas range from 15 to 300 acres in size and average about 60 acres.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 3 inches, strongly acid, gray silt loam that has strong brown, dark yellowish brown, and dark grayish brown mottles

3 to 8 inches, very strongly acid, gray silt loam that has red, yellowish brown, and light gray mottles

Subsoil:

8 to 15 inches, very strongly acid, light brownish gray loam that has brownish yellow and strong brown mottles

15 to 24 inches, very strongly acid, light brownish gray fine sandy loam that has yellowish brown and strong brown mottles

Substratum:

24 to 64 inches, very strongly acid, light brownish gray fine sandy loam that has brownish yellow, yellow, and light yellowish brown mottles

Important soil properties—

Available water capacity: high
Permeability: moderate
Drainage: poorly drained (the surface dries slowly after rains)
Runoff: very slow
Water table: at a depth of about 0.5 foot to 1.5 feet during winter and spring and below a depth of 6.0 feet during the rest of the year
Ponding: ponded after periods of rainfall or flooding when the water table is high
Flooding: frequent, occurring mostly from December through May and lasting from a few hours to several days
Root zone: very deep, but the root development of most plants is limited by the high water table
Shrink-swell potential: low
Hazard of water erosion: slight (K factor—.28; T factor—a maximum allowance of 5 tons per acre per year)
Prime farmland: no (because of the flooding and the wetness)

Included with this soil in mapping are small areas of Cart, Iuka, Mantachie, Mooreville, and Socagee soils. Cart soils have a fragipan. They are in the slightly higher mounded areas and are not subject to flooding. Iuka soils are moderately well drained and are in the slightly higher areas along creek channels. Mantachie and Socagee soils have more clay than the Bibb soil. They are in landscape positions similar to those of the Bibb soil. Mooreville soils have more clay than the Bibb soil. Also, they are better drained and are in the slightly higher landscape positions. Also included are soils that are similar to the Bibb soil but have a surface layer of loam or very fine sandy loam.

The contrasting Cart soils make up less than 5 percent of the map unit. The other included soils are similar to the Bibb soil and make up less than 20 percent of the map unit.

Areas of the Bibb soil are used mainly as woodland. A few areas are used as pasture.

The wooded areas mainly support hardwoods. Pine grows in a few areas. The commercial trees used for timber production are loblolly pine, shortleaf pine, willow oak, and water oak. Yields of loblolly pine are 528 board feet per acre per year over a 50-year period. Based on a 50-year site curve, the mean site index for loblolly pine is 103.

Reforestation in cutover areas of loblolly pine and shortleaf pine occurs naturally where seed trees are in the stand. Reforestation in cutover areas of oaks occurs naturally where mast trees are in the stand. When openings are made in the canopy, invading brush and undesirable hardwood species that are not controlled can delay the establishment or regeneration of desirable hardwoods or pine. Selective thinning, removal of undesirable trees, and protection from wildfire increase yields.

Wetness is the most severe limitation affecting timber production and harvesting. The seasonal high water table restricts the use of equipment to midsummer, when the soil is dry. Seedling survival is restricted in those years when flooding occurs. It is poor in areas where ponding occurs. The seasonal high water table restricts root development. Trees are occasionally subject to windthrow during periods when the soil is wet.

Using standard equipment that has wheels or tracks causes rutting and compaction when the soil is moist and displacement of the surface layer when the soil is dry. Puddling can occur during wet periods, making unsurfaced roads and skid trails impassable. Using low-pressure ground equipment minimizes soil damage and erosion and helps to maintain productivity. The proper design and careful construction of haul roads and care in the selection of sites for culverts and turnouts help to control erosion. Skid trails, firebreaks, and other areas where the surface is disturbed are subject to erosion. Revegetating the spoil from excavations reduces the hazard of rill and gully erosion.

Suitable pasture grasses include bahiagrass, Dallisgrass, and tall fescue. Low inherent soil fertility is a limitation. Wetness and flooding limit the use of some kinds of equipment, limit grass production, and restrict grazing during some periods in most years. Applications of fertilizer and lime, controlled grazing, and a surface drainage system improve yields and help to control erosion. Cool-season legumes, such as white clover and singletary peas, provide winter forage and add nitrogen to the soil.

This soil is unsuitable for cropping. The surface layer is wet for long periods in winter and spring. The soil is too wet for most horticultural crops.

This soil is unsuitable for urban uses. Wetness and flooding keep septic tank absorption fields from operating properly. They are severe limitations on sites for buildings and for local roads and streets. Overcoming these limitations generally is impractical. Coating pipe and treating concrete minimize corrosion.

The suitability of this soil for most recreational uses is limited because of wetness and flooding. The soil provides habitat for many animals. Ducks and other waterfowl use ponded areas. Deer and squirrels can find adequate food and cover. Many songbirds and the pileated woodpecker use areas of this soil for nesting.

The capability subclass is 5w. The woodland ordination symbol is 11W.

BeB—Bienville loamy fine sand, 1 to 3 percent slopes. This very gently sloping soil is on low stream terraces adjacent to flood plains along the Sabine River and Big and Little Cypress Bayous. Individual areas are oblong. They range from 15 to 300 acres in size and average 40 acres.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 10 inches, medium acid, dark yellowish brown loamy fine sand

Subsurface layer:
10 to 27 inches, strongly acid, yellowish brown loamy fine sand

Subsoil:
27 to 64 inches, medium acid, light yellowish brown loamy fine sand that has strong brown lamellae
64 to 80 inches, slightly acid, strong brown lamellae and pale brown fine sandy loam

Important soil properties—

Available water capacity: low
Permeability: moderately rapid
Drainage: somewhat excessively drained
Runoff: slow
Water table: at a depth of 4 to 6 feet during winter and below a depth of 6 feet during the rest of the year
Root zone: very deep
Shrink-swell potential: low
Hazard of water erosion: slight (K factor—.20; T factor—a maximum allowance of 5 tons per acre per year)
Prime farmland: no (because of the available water capacity)

Included with this soil in mapping are small areas of Bernaldo, Cart, Guyton, Latch, Mantachie, Mollville, and Mooreville soils. Bernaldo soils have a loamy subsoil. They are in the higher landscape positions. Cart soils are loamy throughout and have a fragipan. They are in mounded areas. Guyton soils are in low, wet areas. They are loamy throughout. Latch soils are in landscape positions similar to those of the Bienville soil or are in the slightly lower positions. They have a loamy subsoil. Mantachie and Mooreville soils are on flood plains. They are loamy throughout. Mollville soils are on slightly depressed flats and in areas of sinuous drainage patterns. Also included are old oxbows and narrow stream channels.

The contrasting Bernaldo, Cart, Guyton, Mantachie, and Mollville soils make up less than 15 percent of the map unit. The other included soils are similar to the Bienville soil and make up less than 10 percent of the map unit.

Areas of the Bienville soil are used mainly as woodland or pasture. A few areas are used for homesite development.

The wooded areas support hardwoods and pine. The commercial trees used for timber production are loblolly pine, slash pine, and shortleaf pine. Yields of loblolly pine are 350 board feet per acre per year over a 50-year period. Based on a 50-year site curve, the mean site index is 92 for loblolly pine, 83 for shortleaf pine, and 98 for slash pine.

Reforestation in cutover areas of loblolly pine and shortleaf pine occurs naturally where seed trees are in

the stand. Reforestation also can be achieved by planting loblolly pine seedlings. When openings are made in the canopy, invading brush species that are not controlled can delay the establishment or regeneration of pine. Selective thinning, removal of undesirable trees, and protection from wildfire increase yields.

This soil is well suited to timber. Few limitations affect timber production. Seedling mortality may be significant because of droughtiness in this sandy soil. Larger or containerized nursery stock may be needed rather than the usual bare root stock. The loose, sandy surface layer hinders the use of wheeled equipment, especially when the soil is very dry. Using standard equipment that has wheels or tracks causes rutting and compaction when the soil is moist and displacement of the surface layer when the soil is dry.

Using low-pressure ground equipment minimizes soil damage and erosion and helps to maintain productivity. The proper design and careful construction of haul roads and care in the selection of sites for culverts and turnouts help to control erosion. Skid trails, firebreaks, and other areas where the surface is disturbed are subject to rilling and gullying. Revegetating the spoil from excavations reduces the hazard of rill and gully erosion.

This soil is well suited to pasture grasses for grazing or hay, but droughtiness is a limitation. The most commonly grown pasture grasses are bahiagrass, weeping lovegrass, common bermudagrass, and coastal bermudagrass. Low inherent soil fertility is a limitation. Applications of fertilizer and lime and controlled grazing improve yields. Cool-season legumes, such as vetch, provide winter forage and add nitrogen to the soil.

The main suitable crops grown on this soil are peanuts, grain sorghum, and truck crops, such as watermelons. Where the plant cover is inadequate, erosion is a hazard. Conservation tillage and contour farming help to prevent excessive erosion. Crop growth may be limited by an insufficient amount of water during dry periods because of the low available water capacity. The soil is suited to several vineyard and orchard crops. Crop residue management is needed to maintain the content of organic matter and improve tilth. The soil can be tilled throughout a wide range in moisture content. Applications of lime and fertilizer improve yields.

This soil is suited to most urban uses. Proper design and careful installation are needed to overcome seasonal wetness on sites for septic tank absorption fields and for dwellings with basements. The soil is a good source of roadfill material. Treating concrete minimizes corrosion. The sides of shallow excavations can cave in. Seepage and piping are the major problems in pond reservoir areas and on embankments.

This soil is well suited to recreational uses. The native vegetation provides good habitat for game birds, songbirds, small furbearers, and deer. Seed-producing grasses, forbs, shrubs, and nut-bearing trees provide ample food and shelter for most kinds of wildlife. Whitetail deer, bobwhite quail, mourning dove, and songbirds feed in the many open pastures and fields. They benefit from the security of the surrounding woodland cover.

The capability subclass is 2s. The woodland ordination symbol is 10S.

BnA—Bonn-Cart complex, 0 to 1 percent slopes. These soils are on nearly level to depressional and low, mounded stream terraces along the major creeks and bayous in the eastern and southern parts of the county. The soils are on slightly concave flats and on oval mounds. Some areas are subject to flooding during periods of peak runoff. Slopes are 0 to 1 percent. Individual areas are generally long and narrow and parallel drainageways. They range from 20 to 500 acres in size.

The Bonn soil is in low, wet depressions that are sinuous and connected and are 25 to 500 feet wide. The Cart soil is on circular mounds that are 75 to 300 feet wide and 2 to 6 feet high.

This complex is about 60 percent Bonn soil, 35 percent Cart soil, and 5 percent other soils. Individual areas range from 50 to 75 percent Bonn soil, from 20 to 50 percent Cart soil, and from 0 to 15 percent other soils. The Bonn and Cart soils occur as areas so intricately mixed that mapping them separately is not practical at the scale selected for mapping.

The typical sequence, depth, and composition of the layers of the Bonn soil are as follows—

Surface layer:

0 to 6 inches, strongly acid, dark brown silt loam that has grayish brown mottles

Subsurface layer:

6 to 12 inches, strongly acid, grayish brown silt loam that has dark brown mottles

Subsoil:

12 to 22 inches, mildly alkaline, gray loam that has dark yellowish brown mottles and has tongues of silt loam

22 to 43 inches, neutral, grayish brown clay loam that has yellowish red mottles and has tongues of silt loam

43 to 68 inches, neutral, light gray silty clay loam that has yellowish red mottles and has a few white salt crystals

68 to 76 inches, mildly alkaline, light gray clay loam

that has yellowish red mottles and has black concretions

76 to 80 inches, mildly alkaline, light gray, stratified silty clay loam that has yellowish red mottles

Important properties of the Bonn soil—

Available water capacity: moderate, but the content of sodium reduces the amount of water that is available to plants
Permeability: very slow
Drainage: poorly drained (the soil may be ponded for a period of 1 to 12 weeks during winter in most years)
Runoff: slow
Water table: perched within a depth of 2 feet for a few weeks to several months from December through April
Root zone: restricted below a depth of 12 inches by a high content of sodium
Shrink-swell potential: low throughout the subsoil
Hazard of water erosion: slight (K factor—.49; T factor—a maximum allowance of 3 tons per acre per year)
Prime farmland: no (because of the pH, the wetness, the very slow permeability, and excess sodium)

The typical sequence, depth, and composition of the layers of the Cart soil are as follows—

Surface layer:

0 to 3 inches, very strongly acid, dark grayish brown very fine sandy loam

Subsurface layer:

3 to 20 inches, very strongly acid, yellowish brown very fine sandy loam

20 to 37 inches, very strongly acid, light yellowish brown very fine sandy loam

Subsoil:

37 to 46 inches, very strongly acid, brownish yellow very fine sandy loam that has pale brown tongues and strong brown mottles

46 to 57 inches, very strongly acid, yellowish brown, brittle very fine sandy loam that has light gray tongues

57 to 62 inches, very strongly acid loam mottled in shades of brown and red

62 to 80 inches, medium acid, brownish yellow sandy clay loam mottled in shades of yellow and brown

Important properties of the Cart soil—

Available water capacity: moderate
Permeability: slow
Drainage: well drained
Runoff: slow
Water table: at a depth of 3 to 4 feet, or directly above the brittle part of the subsoil, during some periods from November through April
Root zone: deep
Shrink-swell potential: low throughout the subsoil
Hazard of water erosion: slight (K factor—.55; T factor—a maximum allowance of 5 tons per acre per year)
Prime farmland: not considered prime farmland in this map unit, which is dominated by a soil that does not meet the requirements for prime farmland

Included with these soils in mapping are small areas of Bienville, Erno, Guyton, Iuka, Mathiston, Sardis, Scottsville, and Socagee soils. Bienville soils are sandy. They are on the higher terraces. Erno and Scottsville soils are in the higher landscape positions. Guyton soils are in positions on terraces similar to those of the Bonn and Cart soils. Iuka, Mathiston, Sardis, and Socagee soils are along stream channels. Also included are some areas of mounded soils that have higher base saturation and pH than the Cart soil and some areas that are occasionally flooded from November through May for a few hours to a few days. All of the included soils are contrasting and make up less than 15 percent of the map unit.

Most areas of the Bonn and Cart soils support native vegetation and are used for wildlife habitat. A few areas are used as improved pasture.

The suitability of these soils for most of the cultivated crops commonly grown in the county is limited because of wetness and the content of sodium. The soils are hard when dry and cannot be easily kept in good tilth.

Common bermudagrass, bahiagrass, and tall fescue are suitable pasture grasses on these soils. White clover or singletary peas are overseeded in some areas for additional cool-season forage. The response to fertilizer is poor. Wetness, ponding, and the content of sodium limit forage production. A drainage system is needed to increase yields.

The wooded areas support hardwoods and pine. They produce a minimum of timber. Post oak, water oak, and winged elm are the dominant trees on the wet, poorly drained Bonn soil. Mosses tend to cling to most trees and shrubs. Because of a high pH and the content of sodium, planted pine trees do not grow well on the Bonn soil. Based on a 50-year site curve, the mean site index for post oak is 55.

Loblolly pine and mixed hardwoods grow well on the Cart soil. The commercial trees used for timber production are loblolly pine and shortleaf pine. Based on a 50-year site curve, the mean site index is 102 for loblolly pine and 87 for shortleaf pine. Although the Cart soil is suitable for trees, planting only on the mounds is not economical. The reforestation of cutover areas is poor. These areas commonly are left barren. When

openings are made in the canopy, invading brush species dominate the site.

The Bonn soil has several limitations that restrict timber growth and management. Wetness, a high pH, and a high content of sodium restrict root growth and therefore increase the hazard of windthrow and limit the seedling survival rate. Using standard equipment that has wheels or tracks causes rutting and compaction when the soil is moist. Puddling can occur during wet periods, making unsurfaced roads and skid trails slick and almost impassable.

Using low-pressure ground equipment minimizes soil damage and erosion and helps to maintain productivity. The proper design and careful construction of haul roads and care in the selection of sites for culverts and turnouts help to control erosion. Skid trails, firebreaks, and other areas where the surface is disturbed are subject to rilling and gullying. Revegetating the spoil from excavations reduces the hazard of rill and gully erosion.

These soils are not extensively used for wildlife habitat. Deer find adequate browse and cover on the mounds. Songbirds use areas of these soils for feeding. Ducks and other migratory waterfowl are attracted to ponded areas.

The suitability of these soils for most recreational and urban uses is limited. Seasonal wetness and restricted permeability are limitations on sites for septic tank absorption fields. Building site development also is affected by the high water table. Uncoated steel is highly susceptible to corrosion. The soils generally are good sites for farm ponds.

The Bonn soil is in capability subclass 4s and is assigned the woodland ordination symbol 3T. The Cart soil is in capability subclass 2s and is assigned the woodland ordination symbol 11A.

BoC—Bowie very fine sandy loam, 2 to 5 percent slopes. This gently sloping soil generally is on side slopes in the uplands. The surface is plane or weakly convex. Individual areas range from 15 to 900 acres in size and average about 80 acres.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 5 inches, medium acid, dark brown very fine sandy loam

Subsurface layer:

5 to 10 inches, strongly acid, yellowish brown very fine sandy loam

Subsoil:

10 to 23 inches, strongly acid, yellowish brown sandy clay loam that has yellowish red mottles

23 to 31 inches, very strongly acid, yellowish brown clay loam that has yellowish red and red mottles

31 to 46 inches, very strongly acid, yellowish brown sandy clay loam that has red and yellowish red mottles and has common red plinthite nodules

46 to 68 inches, very strongly acid, yellowish brown sandy clay loam that has light brownish gray, brownish yellow, and red mottles, has common red plinthite nodules, and has very pale brown streaks of sand

68 to 83 inches, very strongly acid, mottled strong brown, gray, yellowish brown, and red sandy clay loam that has a few black concretions and a few red plinthite nodules

83 to 96 inches, very strongly acid, mottled gray, dark red, brownish yellow, and yellowish brown sandy clay loam

Important soil properties—

Available water capacity: moderate
Permeability: moderately slow
Drainage: moderately well drained (the surface dries quickly after rains)
Runoff: medium
Water table: at a depth of about 3.5 to 5.0 feet during late winter and early spring and below a depth of 6.0 feet during the rest of the year
Root zone: very deep
Shrink-swell potential: low throughout the upper part of the subsoil
Hazard of water erosion: moderate (K factor—.32; T factor—a maximum allowance of 5 tons per acre per year)
Prime farmland: yes (all the soil properties meet the criteria)

Included with this soil in mapping are small areas of Bernaldo, Cuthbert, Iuka, Kirvin, Lilbert, Sacul, Sawyer, and Warnock soils. Bernaldo soils are in the lower areas. They have less than 5 percent plinthite. Cuthbert, Kirvin, and Sacul soils have a reddish, clayey subsoil. Kirvin and Sacul soils are in the higher areas. Cuthbert soils are on moderately sloping to moderately steep side slopes adjacent to drainageways. Iuka soils are in frequently flooded drainageways. Lilbert and Warnock soils have a sandy surface layer. They are in landscape positions similar to those of the Bowie soil or are in the higher sloping areas. Sawyer soils are clayey in the lower part of the subsoil. They are in nearly level to gently sloping areas. Also included are areas of urban land and some areas of soils that have a clayey subsoil below a depth of 50 inches. The urban land consists of areas that are covered by dwellings, commercial buildings, schools, churches, driveways,

Figure 5.—Coastal bermudagrass pasture in an area of Bowie very fine sandy loam, 2 to 5 percent slopes.

streets, and parking lots. It also includes a few areas that have been disturbed by cutting, filling, or grading.

The contrasting Cuthbert luka, Kirvin, Lilbert, Sacul, and Sawyer soils make up less than 15 percent of the map unit. The other included soils are similar to the Bowie soil and make up less than 5 percent of the map unit.

Areas of the Bowie soil are used mainly as woodland or pasture (fig. 5). A few areas are used for nonirrigated crops or for homesite development.

The wooded areas support hardwoods and pine. The commercial trees used for timber production are loblolly pine, slash pine, and shortleaf pine. Yields of loblolly pine are 340 board feet per acre per year over a 50-year period. Based on a 50-year site curve, the mean site index is 91 for loblolly pine and 80 for shortleaf pine.

Reforestation in cutover areas of loblolly pine and shortleaf pine occurs naturally where seed trees are in the stand. Reforestation also can be achieved by planting loblolly pine seedlings. When openings are made in the canopy, invading brush species that are not controlled can delay the establishment or regeneration of pine. Selective thinning, removal of undesirable trees, and protection from wildfire increase yields.

This soil is well suited to timber. No major limitations affect timber production. Using standard equipment that has wheels or tracks causes rutting and compaction when the soil is moist and displacement of the surface layer when the soil is dry. Puddling can occur during wet periods, making unsurfaced roads and skid trails slick and almost impassable.

Using low-pressure ground equipment minimizes soil damage and erosion and helps to maintain productivity.

The proper design and careful construction of haul roads and care in the selection of sites for culverts and turnouts help to control erosion. Skid trails, firebreaks, and other areas where the surface is disturbed are subject to rilling and gullying. Revegetating the spoil from excavations reduces the hazard of rill and gully erosion.

This soil is well suited to pasture grasses for grazing or hay. No major limitations affect these uses. The most commonly grown pasture grasses are bahiagrass, common bermudagrass, and coastal bermudagrass. Low inherent soil fertility is a limitation. Applications of fertilizer and lime and controlled grazing improve yields. Cool-season legumes, such as vetch and arrowleaf clover, provide winter forage and add nitrogen to the soil.

This soil is suited to a variety of truck crops, including peas and watermelons. Where the plant cover is inadequate, erosion is a hazard. Conservation tillage, terraces, and contour farming help to prevent excessive erosion. Crop growth may be limited by an insufficient amount of water during dry periods in summer. The soil is suited to several kinds of horticultural crops. Crop residue management is needed to maintain the content of organic matter and improve tilth. The soil can be tilled throughout a wide range in moisture content. Applications of lime and fertilizer improve yields.

This soil is suited to most urban uses. Proper design and careful installation are needed to overcome wetness in shallow excavations, the moderately slow permeability on sites for septic tank absorption fields, and seepage in pond reservoir areas. Uncoated underground steel and concrete should be protected from corrosion.

This soil is well suited to recreational uses and provides habitat for many wildlife species. Whitetail deer, bobwhite quail, mourning dove, many songbirds, and other small animals feed in the open pastures and fields. They benefit from the security of the surrounding woodland cover.

The capability subclass is 3e. The woodland ordination symbol is 9A.

CbE—Cuthbert fine sandy loam, 5 to 15 percent slopes. This moderately sloping to moderately steep soil is on uplands. It is on hillslopes above drainageways. Individual areas are long and narrow. They range from 30 to 1,000 acres in size and average about 300 acres.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 4 inches, medium acid, very dark gray fine sandy loam

Subsurface layer:
4 to 6 inches, strongly acid, brown fine sandy loam

Subsoil:
6 to 16 inches, very strongly acid, red clay
16 to 26 inches, very strongly acid, red clay that has common dark red and strong brown mottles
26 to 34 inches, very strongly acid, mottled red and strong brown clay

Substratum:
34 to 60 inches, very strongly acid, mottled red, strong brown, and light brownish gray, stratified, weakly consolidated sandstone and clay

Important soil properties—

Available water capacity: moderate
Permeability: moderately slow
Drainage: well drained
Runoff: rapid
Water table: at a depth of more than 6 feet throughout the year
Root zone: moderately deep over sandstone
Shrink-swell potential: moderate in the subsoil
Hazard of water erosion: severe (K factor—.37; T factor—a maximum allowance of 3 tons per acre per year)
Prime farmland: no (because of the pH, the slope, and the hazard of water erosion)

Included with this soil in mapping are small areas of Bowie, Iuka, Kirvin, Mantachie, Sacul, Sawyer, and Warnock soils. Iuka and Mantachie soils are on bottom land and are subject to flooding. Iuka soils have a loamy, stratified subsoil. Bowie and Mantachie soils have a loamy subsoil. Bowie, Kirvin, and Sacul soils are in the higher gently sloping areas. Sawyer soils are loamy in the upper part of the subsoil. They are in nearly level to gently sloping areas. Warnock soils have a sandy surface layer. They are in landscape positions similar to those of the Cuthbert soil or are in the higher positions.

The contrasting Bowie, Iuka, Mantachie, and Sawyer soils make up less than 5 percent of the map unit. The other included soils are similar to the Cuthbert soil and make up less than 10 percent of the map unit. Also included are areas where the surface layer is gravelly, some areas where slopes are more than 15 percent, and horizontal bands of outcropping stones and boulders.

Areas of the Cuthbert soil are used mainly as woodland or pasture.

The wooded areas support hardwoods and pine. The commercial trees used for timber production are loblolly pine and shortleaf pine. Yields of loblolly pine are 280 board feet per acre per year over a 50-year period. Based on a 50-year site curve, the mean site index is 85 for loblolly pine and 76 for shortleaf pine.

Reforestation in cutover areas of loblolly pine and shortleaf pine occurs naturally where seed trees are in the stand. Reforestation also can be achieved by planting loblolly pine seedlings. When openings are made in the canopy, invading brush and hardwood species that are not controlled can delay the establishment or regeneration of pine. Selective thinning, removal of undesirable trees, and protection from wildfire increase yields.

Some problems affect timber production. Using standard equipment that has wheels or tracks causes rutting and compaction when the soil is moist and displacement of the surface layer when the soil is dry. Because of the clayey subsoil, puddling can occur during wet periods, making unsurfaced roads and skid trails almost impassable. The slope can limit the use of equipment.

Because of the slope and the texture of the surface layer, excessive erosion can occur unless the soil is protected. Using low-pressure ground equipment minimizes soil damage and erosion and helps to maintain productivity. The proper design and careful construction of haul roads and care in the selection of sites for culverts and turnouts help to control erosion. Skid trails, firebreaks, and other areas where the surface is disturbed are subject to rilling and gullying. Revegetating the spoil from excavations reduces the hazard of rill and gully erosion.

This soil is well suited to pasture grasses for grazing. The slope is the major limitation. Suitable pasture grasses include bahiagrass, bermudagrass, and weeping lovegrass. Low inherent soil fertility is a limitation. The soil is seasonally wet or droughty, and the relationship between plant growth and soil moisture is fair or poor. Possible past erosion, the slope, and a slow rate of water infiltration combine to intensify management problems. Because of good surface drainage, the soil can be grazed in winter. Applications of fertilizer and lime and controlled grazing improve yields and help to control erosion. Cool-season legumes, such as arrowleaf clover, crimson clover, singletary peas, and hairy vetch, provide winter forage and add nitrogen to the soil.

This soil is not suitable for cropping because of the slope and the susceptibility to erosion.

Urban uses may be affected by several soil factors. Because of the moderate shrink-swell potential in the subsoil, building foundations can crack. Extensive excavation and filling may be needed during construction because of the slope. The moderately slow permeability in the subsoil and the slope keep septic tank absorption fields from operating satisfactorily. Low strength is the main limitation on sites for local roads and streets. Coating pipe and treating concrete minimize corrosion. Droughtiness is a slight limitation on sites for lawns. The limitations affecting pond reservoir areas are slight. Proper design and careful installation of structures can help to overcome or modify any hazards or limitations.

The suitability of this soil for most recreational uses is limited by the moderately slow permeability and the slope. The native vegetation provides good habitat for game birds, songbirds, small furbearers, and deer. Seed-producing grasses, forbs, shrubs, and nut-bearing trees provide ample food and shelter for most kinds of wildlife. Whitetail deer, bobwhite quail, mourning dove, and songbirds feed in the many open pastures and fields. They benefit from the security of the surrounding woodland cover.

The capability subclass is 6e. The woodland ordination symbol is 8C.

CgE—Cuthbert gravelly fine sandy loam, 5 to 15 percent slopes. This moderately sloping and moderately steep soil is on the side slopes above drainageways in the uplands. Individual areas are long and narrow. They range from 20 to 1,000 acres in size and average about 200 acres.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 6 inches, very strongly acid, very dark grayish brown gravelly fine sandy loam

Subsurface layer:

6 to 14 inches, very strongly acid, light brown gravelly fine sandy loam

Subsoil:

14 to 23 inches, very strongly acid, yellowish red clay that has few brownish yellow mottles

23 to 30 inches, extremely acid, yellowish red clay loam that has common brownish yellow mottles

30 to 36 inches, extremely acid, mottled yellowish red and brownish yellow clay loam that has few red mottles

Substratum:

36 to 60 inches, extremely acid, mottled yellowish red, strong brown, brownish yellow, and light gray, weakly consolidated sandstone and shale having a texture of sandy clay loam

Important soil properties—

Available water capacity: moderate
Permeability: moderately slow
Drainage: well drained
Runoff: rapid
Water table: at a depth of more than 6 feet throughout the year
Root zone: moderately deep over sandstone
Shrink-swell potential: moderate in the subsoil
Hazard of water erosion: moderate (K factor—.20; T factor—a maximum allowance of 3 tons per acre per year)
Prime farmland: no (because of the pH, the slope, and the hazard of water erosion)

Included with this soil in mapping are small areas of Bowie, Darbonne, Iuka, Kirvin, Mantachie, Sacul, Warnock, and Wolfpen soils. Iuka and Mantachie soils are on bottom land and are subject to flooding. Iuka soils have a loamy, stratified subsoil, and Mantachie soils have a loamy subsoil. Bowie, Darbonne, Kirvin, and Sacul soils are in the higher gently sloping areas. Bowie and Darbonne soils have a loamy subsoil. Warnock and Wolfpen soils have a sandy surface layer and a loamy subsoil.

The contrasting Bowie, Darbonne, Iuka, Mantachie, Warnock, and Wolfpen soils make up less than 5 percent of the map unit. The other included soils are similar to the Cuthbert soil and make up less than 10 percent of the map unit. Also included are areas where the surface layer is not gravelly, some areas where slopes are more than 15 percent, and horizontal bands of outcropping stones and boulders.

Areas of the Cuthbert soil are used mainly as woodland or pasture.

The wooded areas support hardwoods and pine. The commercial trees used for timber production are loblolly pine and shortleaf pine. Yields of loblolly pine are 280 board feet per acre per year over a 50-year period. Based on a 50-year site curve, the mean site index is 85 for loblolly pine and 76 for shortleaf pine.

Reforestation in cutover areas of loblolly pine and shortleaf pine occurs naturally where seed trees are in the stand. Reforestation also can be achieved by planting loblolly pine seedlings. When openings are made in the canopy, invading brush and hardwood species that are not controlled can delay the establishment or regeneration of pine. Selective thinning, removal of undesirable trees, and protection from wildfire increase yields.

A few problems affect timber production. Using standard equipment that has wheels or tracks causes rutting and compaction when the soil is moist and displacement of the surface layer when the soil is dry. Because of the clayey subsoil, puddling can occur during wet periods, making unsurfaced roads and skid trails slick and almost impassable. The slope can limit the use of equipment.

Because of the slope, excessive erosion can occur unless the soil is protected. Using low-pressure ground equipment minimizes soil damage and erosion and helps to maintain productivity. The proper design and careful construction of haul roads and care in the selection of sites for culverts and turnouts help to control erosion. Skid trails, firebreaks, and other areas where the surface is disturbed are subject to rilling and gullying. Revegetating the spoil from excavations reduces the hazard of rill and gully erosion.

This soil is well suited to pasture grasses for grazing. Suitable pasture grasses include bahiagrass, bermudagrass, and weeping lovegrass. Low inherent soil fertility is a limitation. The soil is seasonally wet or droughty, and the relationship between plant growth and soil moisture is fair or poor. Possible past erosion, the slope, and a slow rate of water infiltration combine to intensify management problems. Because of good surface drainage, the soil can be grazed in winter. Applications of fertilizer and lime and controlled grazing improve yields and help to control erosion. Cool-season legumes, such as arrowleaf clover, crimson clover, singletary peas, and hairy vetch, provide winter forage and add nitrogen to the soil.

This soil is not suitable for cropping because of the slope and the susceptibility to erosion.

Urban uses may be affected by several soil factors. Because of the moderate shrink-swell potential in the subsoil, building foundations can crack. Extensive excavation and filling may be needed during construction because of the slope. The moderately slow permeability in the subsoil keeps septic tank absorption fields from operating satisfactorily. Low strength, the moderate shrink-swell potential, and the slope are limitations on sites for local roads and streets. Coating pipe and treating concrete minimize corrosion. Lawns are moderately affected by the content of gravel and by droughtiness in summer. The limitations affecting pond reservoir areas are slight. Proper design and careful installation of structures can help to overcome or modify any hazards or limitations.

The suitability of this soil for most recreational uses is limited by the restricted permeability in the subsoil and the slope. The native vegetation provides good habitat for game birds, songbirds, small furbearers, and deer. Seed-producing grasses, forbs, shrubs, and nut-bearing trees provide ample food and shelter for most kinds of wildlife. Whitetail deer, bobwhite quail, mourning dove, and songbirds feed in the many open

pastures and fields. They benefit from the security of the surrounding woodland cover.

The capability subclass is 6e. The woodland ordination symbol is 8F.

CgF—Cuthbert gravelly fine sandy loam, 15 to 35 percent slopes. This moderately steep and steep soil is on outlying hills that are the highest parts of the survey area. Individual areas are generally oval and may include one hill or several hills joined together. The areas range from 20 to 500 acres in size and average about 100 acres.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 3 inches, medium acid, very dark grayish brown gravelly fine sandy loam

Subsurface layer:

3 to 9 inches, medium acid, light yellowish brown very gravelly fine sandy loam

Subsoil:

9 to 23 inches, very strongly acid, yellowish red clay that has few brownish yellow mottles

23 to 29 inches, very strongly acid, red clay that has yellowish red mottles

29 to 39 inches, very strongly acid, mottled yellowish red and red silty clay

Substratum:

39 to 45 inches, extremely acid, light gray silty clay loam that has yellowish red and red mottles

45 to 60 inches, extremely acid, mottled brownish yellow and very pale brown, stratified, weakly consolidated sandstone and shale having strong brown mottles

Important soil properties—

Available water capacity: moderate
Permeability: moderately slow
Drainage: well drained
Runoff: rapid
Water table: at a depth of more than 6 feet throughout the year
Root zone: moderately deep over weakly consolidated, stratified sandstone and shale
Shrink-swell potential: moderate in the subsoil
Hazard of water erosion: severe (K factor—.20; T factor—a maximum allowance of 3 tons per acre per year)
Prime farmland: no (because of the pH, the slope, and the hazard of water erosion)

Included with this soil in mapping are small areas of Bowie, Darco, and Kirvin soils; the graded Kirvin soils; and Lilbert and Warnock soils. Bowie soils have a loamy subsoil. They are in gently sloping areas. Darco soils have a sandy surface layer that is more than 40 inches thick. They are on crests. Kirvin soils have a subsoil that is thicker than that of the Cuthbert soil. They are on crests. The graded Kirvin soils are in areas that have been mined for gravel. Lilbert and Warnock soils have a sandy surface layer. They are on crests and the lower side slopes.

The contrasting Bowie, Darco, Lilbert, and Warnock soils make up less than 10 percent of the map unit. The other included soils are similar to the Cuthbert soil and make up less than 5 percent of the map unit. Also included are some areas where bands of ironstone ledges crop out and steep buttes are common. Stones and boulders along some of these outcrops create a bench effect or stairsteps.

Areas of the Cuthbert soil are used mainly as woodland and wildlife habitat. Shortleaf pine is the major commercial tree. The timber grown on this soil is used mainly for pulpwood rather than lumber. The pulpwood is used in the production of paper. Because of the slope, most areas are inaccessible to vehicles and domestic livestock. They are a natural refuge for deer and other wildlife.

The wooded areas support hardwoods and pine. The commercial trees used for timber production are loblolly pine and shortleaf pine. Yields of loblolly pine are 230 board feet per acre per year over a 50-year period. Based on a 50-year site curve, the mean site index for shortleaf pine is 70.

Reforestation in cutover areas of loblolly pine and shortleaf pine occurs naturally where seed trees are in the stand. Reforestation also can be achieved by planting loblolly pine seedlings. When openings are made in the canopy, invading brush species that are not controlled can delay the establishment or regeneration of pine. Selective thinning, removal of undesirable trees, and protection from wildfire increase yields.

Significant limitations affect timber production. Using standard equipment that has wheels or tracks causes rutting and compaction when the soil is moist and displacement of the surface layer when the soil is dry. Because of the clayey subsoil, puddling can occur during wet periods, making unsurfaced roads and skid trails slick and almost impassable. The slope limits the use of equipment.

Because of the slope and the texture of the surface layer, excessive erosion can occur unless the soil is protected. Using low-pressure ground equipment minimizes soil damage and erosion and helps to

maintain productivity. The proper design and careful construction of haul roads and care in the selection of sites for culverts and turnouts help to control erosion. Skid trails, firebreaks, and other areas where the surface is disturbed are subject to rilling and gullying. Revegetating the spoil from excavations reduces the hazard of rill and gully erosion.

This soil can be used for pasture grasses and for grazing. Suitable pasture grasses include bermudagrass and weeping lovegrass. The erosion caused by land clearing and seedbed preparation may be extensive. Low inherent soil fertility is a limitation. Possible past erosion, the slope, and a slow rate of water infiltration combine to intensify management problems. Because of good surface drainage, the soil can be grazed in winter. Applications of fertilizer and lime and controlled grazing improve yields and help to control erosion. Cool-season legumes, such as arrowleaf clover, crimson clover, singletary peas, and hairy vetch, provide winter forage and add nitrogen to the soil.

This soil is not suitable for cropping because of the slope, the susceptibility to erosion, and the fragments of ironstone.

Urban uses may be affected by several soil factors. Because of the moderate shrink-swell potential in the subsoil, building foundations can crack. Extensive excavation and filling may be needed during construction because of the slope. The moderately slow permeability in the subsoil and the slope keep septic tank absorption fields from operating satisfactorily. Low strength and the slope are problems on sites for local roads and streets. Coating pipe and treating concrete minimize corrosion. The limitations affecting pond reservoir areas are slight. Proper design and careful installation of structures can help to overcome or modify any hazards or limitations.

The suitability of this soil for most recreational uses is limited by the restricted permeability in the subsoil and the slope. The native vegetation provides good habitat for game birds, songbirds, small furbearers, and deer. Seed-producing grasses, forbs, shrubs, and nut-bearing trees provide ample food and shelter for most kinds of wildlife. Whitetail deer, bobwhite quail, mourning dove, and songbirds feed in the surrounding pastures and fields. They benefit from the security of the woodland cover.

The capability subclass is 7e. The woodland ordination symbol is 8R.

Cy—Cypress clay loam, submerged. This nearly level soil is in lakebeds, oxbows, stream channels, and perennially submerged areas in and bordering Caddo Lake. The water table fluctuates directly with seasonal lake levels. The surface is plane to convex. Slopes are 0 to 1 percent. Individual areas range from 10 to 450 acres in size and average about 200 acres.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
- 4 inches to 0, partially decomposed organic matter
- 0 to 6 inches, extremely acid, gray clay loam that has yellowish brown mottles

Subsoil:
- 6 to 20 inches, very strongly acid, gray clay that has yellowish brown mottles
- 20 to 60 inches, very strongly acid, gray clay that has strong brown mottles

Important soil properties—

Available water capacity: high
Permeability: very slow
Drainage: very poorly drained
Runoff: ponded
Water table: about 1 to 4 feet above the surface during most of the year and 2 feet above to 1 foot below the surface during dry periods
Flooding: frequent, occurring from January through December and lasting from a few weeks to many months
Root zone: shallow because of the water table
Shrink-swell potential: moderate
Hazard of water erosion: slight
Prime farmland: no (because of the pH, the wetness, the very slow permeability, and the frequent flooding)

Included with this soil in mapping are small areas of Bibb, Guyton, Iuka, Mantachie, Mathiston, Mooreville, Sardis, and Socagee soils. All of these included soils are subject to flooding. They are in the slightly higher areas adjacent to Caddo Lake, on islands in the lake, along the main channels running through the lake, and adjacent to Big Cypress Bayou. They are contrasting soils and make up less than 10 percent of the map unit. Also included are soils that are similar to the Cypress soil but have a surface layer of silty clay loam to fine sandy loam and small areas of water. The areas of water generally have water depths of more than 4 feet throughout the year and do not support vegetation. They make up less than 20 percent of the map unit.

Areas of the Cypress soil are used mainly for recreational purposes and wildlife habitat. Most areas are wooded.

This soil dominantly supports baldcypress trees. Because of the perennial water levels and limited accessibility, harvesting and transporting cut timber are not commercially feasible.

This soil is not suited to pasture grasses or to urban uses. It is well suited to recreational uses and provides habitat for many wildlife species. Ducks, herons, beavers, muskrat, and other wetland species use areas of this soil.

The capability subclass is 8w. The woodland ordination symbol is 0W.

DbC—Darbonne fine sandy loam, 3 to 5 percent slopes. This gently sloping soil is on ridges and side slopes in the uplands. The surface is plane or weakly convex. Individual areas range from 10 to 100 acres in size and average about 75 acres.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 6 inches, slightly acid, brown fine sandy loam

Subsurface layer:
6 to 18 inches, medium acid, light yellowish brown fine sandy loam
18 to 22 inches, strongly acid, strong brown fine sandy loam

Subsoil:
22 to 33 inches, strongly acid, yellowish red fine sandy loam
33 to 41 inches, strongly acid, strong brown gravelly sandy clay loam that has yellowish brown and yellowish red mottles
41 to 47 inches, very strongly acid, mottled red, yellowish red, and brownish yellow sandy clay loam
47 to 53 inches, very strongly acid, brownish yellow gravelly sandy clay loam that has red mottles

Substratum:
53 to 80 inches, extremely acid, red sandy clay loam that has brownish yellow and very pale brown mottles

Important soil properties—

Available water capacity: low
Permeability: moderately slow
Drainage: well drained
Runoff: medium
Water table: at a depth of more than 6 feet throughout the year
Root zone: very deep
Shrink-swell potential: low
Hazard of water erosion: moderate (K factor—.28; T factor—a maximum allowance of 4 tons per acre per year)
Prime farmland: no (because of the available water capacity)

Included with this soil in mapping are small areas of Bowie, Cuthbert, Kirvin, and Wolfpen soils. Bowie and Kirvin soils are in landscape positions similar to those of the Darbonne soil. Bowie soils do not have more than 15 percent gravel and have plinthite in the subsoil. Cuthbert and Kirvin soils have a clayey subsoil. Cuthbert soils are on moderately sloping to moderately steep side slopes. Wolfpen soils have a sandy surface layer that is 20 to 40 inches thick. They are in landscape positions similar to those of the Darbonne soil or are in the lower positions.

The contrasting Cuthbert and Kirvin soils make up less than 10 percent of the map unit. The other included soils are similar to the Darbonne soil and make up less than 20 percent of the map unit.

Areas of the Darbonne soil are used mainly as woodland or pasture. A few areas are used for homesite development.

The wooded areas support hardwoods and pine. The commercial trees used for timber production are loblolly pine and shortleaf pine. Yields of loblolly pine are 280 board feet per acre per year over a 50-year period. Based on a 50-year site curve, the mean site index is 85 for loblolly pine and 75 for shortleaf pine.

Reforestation in cutover areas of loblolly pine and shortleaf pine occurs naturally where seed trees are in the stand. Reforestation also can be achieved by planting loblolly pine seedlings. When openings are made in the canopy, invading brush and hardwood species that are not controlled can delay the establishment or regeneration of pine. Selective thinning, removal of undesirable trees, and protection from wildfire increase yields.

This soil is well suited to timber. No major limitations affect timber production. Using standard equipment that has wheels or tracks causes rutting and compaction when the soil is moist and displacement of the surface layer when the soil is dry. Puddling can occur during wet periods, making unsurfaced roads and skid trails slick and almost impassable.

Using low-pressure ground equipment minimizes soil damage and erosion and helps to maintain productivity. The proper design and careful construction of haul roads and care in the selection of sites for culverts and turnouts help to control erosion. Skid trails, firebreaks, and other areas where the surface is disturbed are subject to rilling and gullying. Revegetating the spoil from excavations reduces the hazard of rill and gully erosion.

This soil is well suited to pasture grasses for grazing or hay. No major limitations affect these uses. Suitable pasture grasses include bahiagrass, bermudagrass, Dallisgrass, tall fescue, and weeping lovegrass. Low inherent soil fertility is a limitation. Applications of

fertilizer and lime and controlled grazing improve yields. Cool-season legumes, such as white clover, singletary peas, and vetch, provide winter forage and add nitrogen to the soil.

The main suitable crops grown on this soil are corn, grain sorghum, and truck crops, such as peas. Where the plant cover is inadequate or the slope exceeds 3 percent, erosion is a hazard. Conservation tillage, terraces, and contour farming help to prevent excessive erosion. Crop growth may be limited by an insufficient amount of water during dry periods in summer. The soil is suited to several kinds of horticultural crops. Crop residue management is needed to maintain the content of organic matter and improve tilth. The soil can be tilled throughout a wide range in moisture content. Applications of lime and fertilizer improve yields.

This soil is suited to recreational uses, but small stones are a limitation in some areas. The native vegetation provides good habitat for game birds, songbirds, small furbearers, and deer. Seed-producing grasses, forbs, shrubs, and nut-bearing trees provide ample food and shelter for most kinds of wildlife. Whitetail deer, bobwhite quail, mourning dove, and songbirds feed in the many open pastures and fields. They benefit from the security of the surrounding woodland cover.

Urban uses may be affected by several soil factors. The moderately slow permeability in the subsoil keeps septic tank absorption fields from operating satisfactorily. Coating pipe and treating concrete minimize corrosion. Droughtiness and small stones may be limitations on sites for lawns. Seepage may be a problem in pond reservoir areas. The limitations that affect buildings and local roads and streets are slight. Proper design and careful installation can help to overcome or modify any hazards or limitations.

The capability subclass is 3e. The woodland ordination symbol is 8F.

DcC—Darco loamy fine sand, 2 to 5 percent slopes. This gently sloping soil is on broad interstream divides and slightly oblong ridges in the uplands. The surface is plane to convex. Individual areas range from 10 to 300 acres in size and average about 40 acres.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 3 inches, very strongly acid, dark grayish brown loamy fine sand

Subsurface layer:

3 to 8 inches, strongly acid, brown loamy fine sand

8 to 66 inches, slightly acid, light yellowish brown loamy fine sand

Subsoil:

66 to 80 inches, strongly acid, strong brown sandy clay loam that has common red mottles and has streaks of light yellowish brown clean sand

80 to 90 inches, very strongly acid, yellowish brown sandy clay loam that has common strong brown and yellowish red mottles and has streaks of pale brown clean sand

Important soil properties—

Available water capacity: low
Permeability: moderate
Drainage: somewhat excessively drained
Runoff: slow
Water table: at a depth of more than 6 feet throughout the year
Root zone: very deep
Shrink-swell potential: low
Hazard of water erosion: slight (K factor—.17; T factor—a maximum allowance of 5 tons per acre per year)
Prime farmland: no (because of the available water capacity)

Included with this soil in mapping are small areas of Bowie, Cuthbert, Darden, Kirvin, Lilbert, and Warnock soils. Bowie soils have a surface layer that is less than 20 inches thick. They are in landscape positions similar to those of the Darco soil or are in the lower positions. Cuthbert and Kirvin soils have a clayey subsoil. They are on ridges and side slopes. Darden and Lilbert soils are in landscape positions similar to those of the Darco soil. Darden soils are sandy throughout, and Lilbert soils have a surface layer that is 20 to 40 inches thick. Warnock soils have a sandy surface layer that is less than 20 inches thick. They are on side slopes. Also included are a few small areas of soils that have slopes of more than 5 percent.

The contrasting Bowie, Cuthbert, and Kirvin soils make up less than 5 percent of the map unit. The other included soils are similar to the Darco soil and make up less than 15 percent of the map unit.

Areas of the Darco soil are used mainly as woodland. A few areas are used as pasture.

The wooded areas support hardwoods and pine. The commercial trees used for timber production are loblolly pine, slash pine, and shortleaf pine. Yields of loblolly pine are 280 board feet per acre per year over a 50-year period. Based on a 50-year site curve, the mean site index is 85 for loblolly pine and 68 for shortleaf pine.

Reforestation in cutover areas of loblolly pine and shortleaf pine occurs naturally where seed trees are in the stand. Reforestation also can be achieved by planting loblolly pine seedlings. When openings are

made in the canopy, invading brush and hardwood species that are not controlled can delay the establishment or regeneration of pine. Selective thinning, removal of undesirable trees, and protection from wildfire increase yields.

A few problems affect timber production. Seedling mortality may be significant because of droughtiness in this sandy soil. Larger or containerized nursery stock may be needed rather than the usual bare root stock. The loose, sandy surface layer hinders the use of wheeled equipment, especially when the soil is very dry. Using standard equipment that has wheels or tracks causes rutting and compaction when the soil is moist and displacement of the surface layer when the soil is dry.

Using low-pressure ground equipment minimizes soil damage and erosion and helps to maintain productivity. The proper design and careful construction of haul roads and care in the selection of sites for culverts and turnouts help to control erosion. Skid trails, firebreaks, and other areas where the surface is disturbed are subject to rilling and gullying. Revegetating the spoil from excavations reduces the hazard of rill and gully erosion.

Suitable pasture grasses include bermudagrass and weeping lovegrass. Low inherent soil fertility is a limitation. Although only low amounts of soil moisture are held in the profile, most of the moisture is readily available to plants. Obtaining a firm seedbed is difficult. Emerging grass seedlings can be killed by windblown sand unless cultural practices are applied. The soil is well suited to grazing in winter and in wet periods. Applications of fertilizer and lime and controlled grazing improve yields and help to control erosion. Cool-season legumes, such as hairy vetch, provide winter forage and add nitrogen to the soil.

This soil is suitable for peas, corn, and watermelons. Where the plant cover is inadequate or the slope exceeds 3 percent, erosion is a hazard. Conservation tillage, terraces, and contour farming help to prevent excessive erosion. Crop growth may be limited by a lack of water during dry periods because of the low available water capacity in the upper part of the soil. The soil generally is not suited to horticultural crops. If these crops were grown, special management and careful plant selection would be needed. Crop residue management is needed to maintain the content of organic matter and improve tilth. The soil can be tilled throughout a wide range in moisture content. Applications of lime and fertilizer improve yields.

Urban uses may be affected by several soil factors. The rapid permeability in the topsoil keeps septic tank absorption fields from operating satisfactorily. Coating pipe and treating concrete minimize corrosion. Droughtiness may be a limitation on sites for lawns. Seepage may be a problem in pond reservoir areas. The limitations that affect buildings and local roads and streets are slight. Proper design and careful installation of structures can help to overcome or modify any hazards or limitations.

The suitability of this soil for most recreational uses is limited by the sandy surface layer. The native vegetation provides good habitat for game birds, songbirds, small furbearers, and deer. Seed-producing grasses, forbs, shrubs, and nut-bearing trees provide ample food and shelter for most kinds of wildlife. Whitetail deer, bobwhite quail, mourning dove, and songbirds feed in the many open pastures and fields. They benefit from the security of the surrounding woodland cover.

The capability subclass is 3s. The woodland ordination symbol is 8S.

DcE—Darco loamy fine sand, 8 to 15 percent slopes. This strongly sloping and moderately steep soil is on side slopes in the uplands. The surface is plane or weakly convex. Individual areas range from 15 to 250 acres in size and average about 50 acres.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
- 0 to 3 inches, medium acid, brown loamy fine sand

Subsurface layer:
- 3 to 36 inches, medium acid, yellowish brown loamy fine sand
- 36 to 61 inches, medium acid, pale brown loamy fine sand
- 61 to 69 inches, strongly acid, very pale brown loamy fine sand

Subsoil:
- 69 to 77 inches, strongly acid, strong brown sandy clay loam mottled in shades of yellow and brown
- 77 to 90 inches, very strongly acid, brownish yellow sandy clay loam mottled in shades of brown and red

Important soil properties—

Available water capacity: low
Permeability: moderate
Drainage: well drained (the surface dries quickly after rains)
Runoff: slow
Water table: below a depth of 6 feet throughout the year
Flooding: none
Root zone: very deep

Shrink-swell potential: low
Hazard of water erosion: severe (K factor—.17; T factor—a maximum allowance of 5 tons per acre per year)
Prime farmland: no (because of the available water capacity and the slope)

Included with this soil in mapping are small areas of Bowie, Cuthbert, Darden, Kirvin, Lilbert, and Warnock soils. Bowie soils have a loamy surface layer. They are on smoother slopes. Cuthbert and Kirvin soils have a clayey subsoil. Cuthbert soils generally are in the lower landscape positions, and Kirvin soils are on ridges. Darden and Warnock are in landscape positions similar to those of the Darco soil. Darden soils are sandy throughout, and Warnock soils have a surface layer that is as much as 20 inches thick. Lilbert soils have a surface layer that is 20 to 40 inches thick. They are in gently sloping areas. Also included are a few small areas of soils that have slopes of less than 8 percent or more than 15 percent.

The contrasting Bowie, Cuthbert, and Kirvin soils make up less than 5 percent of the map unit. The other included soils are similar to the Darco soil and make up less than 20 percent of the map unit.

Areas of the Darco soil are used mainly as woodland. A few areas are used as pasture.

The wooded areas support hardwoods and pine. The commercial trees used for timber production are loblolly pine, slash pine, and shortleaf pine. Yields of loblolly pine are 280 board feet per acre per year over a 50-year period. Based on a 50-year site curve, the mean site index is 85 for loblolly pine and 68 for shortleaf pine.

Reforestation in cutover areas of loblolly pine and shortleaf pine occurs naturally where seed trees are in the stand. Reforestation also can be achieved by planting loblolly pine seedlings. When openings are made in the canopy, invading brush and hardwood species that are not controlled can delay the establishment or regeneration of pine. Selective thinning, removal of undesirable trees, and protection from wildfire increase yields.

A few problems affect timber production. Seedling mortality may be significant because of droughtiness in this sandy soil. Larger or containerized nursery stock may be needed rather than the usual bare root stock. The loose, sandy surface layer hinders the use of wheeled equipment, especially when the soil is very dry. Using standard equipment that has wheels or tracks causes rutting and compaction when the soil is moist and displacement of the surface layer when the soil is dry. The slope can limit the use of equipment.

Because of the slope, excessive erosion can occur unless the soil is protected. Using low-pressure ground equipment minimizes soil damage and erosion and helps to maintain productivity. The proper design and careful construction of haul roads and care in the selection of sites for culverts and turnouts help to control erosion. Skid trails, firebreaks, and other areas where the surface is disturbed are subject to rilling and gullying. Revegetating the spoil from excavations reduces the hazard of rill and gully erosion.

Suitable pasture grasses include bermudagrass and weeping lovegrass. Low inherent soil fertility is a limitation. Although only low amounts of soil moisture are held in the profile, most of the moisture is readily available to plants. Obtaining a firm seedbed is difficult. Emerging grass seedlings can be killed by windblown sand unless cultural practices are applied. The soil is well suited to grazing in winter and in wet periods. Applications of fertilizer and lime and controlled grazing improve yields and help to control erosion. Cool-season legumes, such as hairy vetch, provide winter forage and add nitrogen to the soil.

This soil is not suitable for cropping because of the slope and the susceptibility to erosion.

Urban uses may be affected by several soil factors. Extensive excavation and filling may be needed during construction because of the slope. The rapid permeability in the topsoil and the slope keep septic tank absorption fields from operating satisfactorily. The slope hinders the construction of local roads and streets. Coating pipe and treating concrete minimize corrosion. Droughtiness and the slope may be limitations on sites for lawns. Seepage may be a problem in pond reservoir areas. Proper design and careful installation of structures can help to overcome or modify any hazards or limitations.

The suitability of this soil for most recreational uses is limited by the sandy surface layer and the slope. The native vegetation provides good habitat for game birds, songbirds, small furbearers, and deer. Seed-producing grasses, forbs, shrubs, and nut-bearing trees provide ample food and shelter for most kinds of wildlife. Whitetail deer, bobwhite quail, mourning dove, and songbirds feed in the many open pastures and fields. They benefit from the security of the surrounding woodland cover.

The capability subclass is 6e. The woodland ordination symbol is 8S.

DrC—Darden fine sand, 1 to 5 percent slopes. This gently sloping soil is on ridges in the uplands. The surface is plane or weakly convex. Individual areas range from 20 to 300 acres in size and average about 150 acres.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 10 inches, medium acid, dark yellowish brown fine sand

Subsurface layer:
10 to 19 inches, medium acid, light yellowish brown fine sand

Subsoil:
19 to 70 inches, strongly acid, strong brown fine sand
70 to 80 inches, medium acid, strong brown fine sand that has a few lamellae

Important soil properties—

Available water capacity: low
Permeability: rapid
Drainage: excessively drained
Runoff: very slow
Water table: at a depth of more than 6 feet throughout the year
Root zone: very deep
Shrink-swell potential: low
Hazard of water erosion: moderate (K factor—.15; T factor—a maximum allowance of 5 tons per acre per year)
Prime farmland: no (because of the available water capacity)

Included with this soil in mapping are small areas of Darco, Lilbert, Pickton, Warnock, and Wolfpen soils. All of these included soils have a loamy subsoil. Lilbert and Wolfpen soils have a surface layer that is 20 to 40 inches thick. Darco and Pickton soils have a surface layer that is 40 to 80 inches thick. Warnock soils have a sandy surface layer that is less than 20 inches thick. They are on side slopes. Also included are a few areas of soils that have a red loamy subsoil, have a sandy surface layer that is less than 20 inches thick, and are on knolls and a few areas where the surface layer is loamy fine sand.

The contrasting Warnock soils make up less than 5 percent of the map unit. The other included soils are similar to the Darden soil and make up less than 20 percent of the map unit.

Areas of the Darden soil are used mainly as woodland. A few areas are used as pasture.

The wooded areas support hardwoods and pine. The commercial trees used for timber production are loblolly pine, slash pine, and shortleaf pine. Yields of loblolly pine are 230 board feet per acre per year over a 50-year period. Based on a 50-year site curve, the mean site index is 80 for loblolly pine and 70 for shortleaf pine.

Reforestation in cutover areas of loblolly pine and shortleaf pine occurs naturally where seed trees are in the stand. Reforestation also can be achieved by planting loblolly pine seedlings. When openings are made in the canopy, invading brush and hardwood species that are not controlled can delay the establishment or regeneration of pine. Selective thinning, removal of undesirable trees, and protection from wildfire increase yields.

A few problems affect timber production. Seedling mortality may be significant because of droughtiness in this sandy soil. Larger or containerized nursery stock may be needed rather than the usual bare root stock. The loose, sandy surface layer hinders the use of wheeled equipment, especially when the soil is very dry. Using standard equipment that has wheels or tracks causes rutting and compaction when the soil is moist and displacement of the surface layer when the soil is dry.

Using low-pressure ground equipment minimizes soil damage and erosion and helps to maintain productivity. The proper design and careful construction of haul roads and care in the selection of sites for culverts and turnouts help to control erosion. Skid trails, firebreaks, and other areas where the surface is disturbed are subject to rilling and gullying. Revegetating the spoil from excavations reduces the hazard of rill and gully erosion.

Suitable pasture grasses include bermudagrass and weeping lovegrass. Low inherent soil fertility is a limitation. Although only low amounts of soil moisture are held in the profile, most of the moisture is readily available to plants. Obtaining a firm seedbed is difficult. Emerging grass seedlings can be killed by windblown sand unless cultural practices are applied. The soil is well suited to grazing in winter and in wet periods. Applications of fertilizer and lime and controlled grazing improve yields and help to control erosion. Cool-season legumes, such as hairy vetch, provide winter forage and add nitrogen to the soil.

This soil is suitable for peas, corn, and watermelons. Where the plant cover is inadequate or the slope exceeds 3 percent, erosion is a hazard. Conservation tillage, terraces, and contour farming help to prevent excessive erosion. Crop growth may be limited by a lack of water during dry periods because of the low available water capacity in the upper part of the soil. The soil generally is not suited to horticultural crops. If these crops were grown, special management and careful plant selection would be needed. Crop residue management is needed to maintain the content of organic matter and improve tilth. The soil can be tilled

throughout a wide range in moisture content. Applications of lime and fertilizer improve yields.

Urban uses may be affected by several soil factors. The rapid permeability in the topsoil keeps septic tank absorption fields from operating satisfactorily. Coating pipe and treating concrete minimize corrosion. Droughtiness may be a limitation on sites for lawns. Seepage may be a problem in pond reservoir areas. The limitations that affect buildings and local roads and streets are slight. Proper design and careful installation of structures can help to overcome or modify any hazards or limitations.

The suitability of this soil for most recreational uses is limited by the sandy surface layer. The native vegetation provides good habitat for game birds, songbirds, small furbearers, and deer. Seed-producing grasses, forbs, shrubs, and nut-bearing trees provide ample food and shelter for most kinds of wildlife. Whitetail deer, bobwhite quail, mourning dove, and songbirds feed in the many open pastures and fields. They benefit from the security of the surrounding woodland cover.

The capability subclass is 4s. The woodland ordination symbol is 8S.

DrE—Darden fine sand, 5 to 15 percent slopes. This strongly sloping and moderately steep soil is on side slopes in the uplands. The surface is plane or weakly convex. Individual areas range from 20 to 200 acres in size and average about 100 acres.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 3 inches, very strongly acid, brown fine sand

Subsurface layer:
3 to 7 inches, very strongly acid, yellowish brown fine sand

Subsoil:
7 to 42 inches, very strongly acid, yellowish brown loamy fine sand
42 to 80 inches, very strongly acid, very pale brown fine sand

Important soil properties—

Available water capacity: low
Permeability: rapid
Drainage: excessively drained
Runoff: very slow
Water table: at a depth of more than 6 feet throughout the year
Root zone: very deep
Shrink-swell potential: low
Hazard of water erosion: moderate (K factor—.15; T factor—a maximum allowance of 5 tons per acre per year)
Prime farmland: no (because of the available water capacity and the slope)

Included with this soil in mapping are small areas of Bibb, Cuthbert, Darco, luka, Lilbert, Pickton, Warnock, and Wolfpen soils. Bibb and luka soils are stratified throughout. They are on bottom land and are subject to flooding. Cuthbert and Warnock soils are in landscape positions similar to those of the Darden soil. Cuthbert soils have a clayey subsoil. Warnock soils have a sandy surface layer that is less than 20 inches thick and have a loamy subsoil. Darco and Pickton soils have a loamy subsoil. They are in landscape positions similar to those of the Darden soil or are in the higher convex areas. Lilbert and Wolfpen soils have a loamy subsoil. They are on the higher ridges. Also included are a few small areas of soils that have slopes of less than 5 percent or more than 15 percent and a few areas where the surface layer is loamy fine sand.

The contrasting Bibb, Cuthbert, luka, and Warnock soils make up less than 5 percent of the map unit. The other included soils are similar to the Darden soil and make up less than 20 percent of the map unit.

Areas of the Darden soil are used mainly as woodland. A few areas are used as pasture.

The wooded areas support hardwoods and pine. The commercial trees used for timber production are loblolly pine, slash pine, and shortleaf pine. Yields of loblolly pine are 230 board feet per acre per year over a 50-year period. Based on a 50-year site curve, the mean site index is 80 for loblolly pine and 70 for shortleaf pine.

Reforestation in cutover areas of loblolly pine and shortleaf pine occurs naturally where seed trees are in the stand. Reforestation also can be achieved by planting loblolly pine seedlings. When openings are made in the canopy, invading brush and hardwood species that are not controlled can delay the establishment or regeneration of pine. Selective thinning, removal of undesirable trees, and protection from wildfire increase yields.

A few problems affect timber production. Seedling mortality may be significant because of droughtiness in this sandy soil. Larger or containerized nursery stock may be needed rather than the usual bare root stock. The loose, sandy surface layer hinders the use of wheeled equipment, especially when the soil is very dry. Using standard equipment that has wheels or tracks causes rutting and compaction when the soil is moist and displacement of the surface layer when the soil is dry. The slope can limit the use of equipment.

Because of the slope, excessive erosion can occur unless the soil is protected. Using low-pressure ground equipment minimizes soil damage and erosion and helps to maintain productivity. The proper design and careful construction of haul roads and care in the selection of sites for culverts and turnouts help to control erosion. Skid trails, firebreaks, and other areas where the surface is disturbed are subject to rilling and gullying. Revegetating the spoil from excavations reduces the hazard of rill and gully erosion.

Suitable pasture grasses include bermudagrass and weeping lovegrass. Low inherent soil fertility is a limitation. Although only low amounts of soil moisture are held in the profile, most of the moisture is readily available to plants. Obtaining a firm seedbed is difficult. Emerging grass seedlings can be killed by windblown sand unless cultural practices are applied. The soil is well suited to grazing in winter and in wet periods. Applications of fertilizer and lime and controlled grazing improve yields and help to control erosion. Cool-season legumes, such as hairy vetch, provide winter forage and add nitrogen to the soil.

This soil is not suitable for cultivation. It is susceptible to excessive erosion because of the slope, and it has a low available water capacity in the upper part. The soil generally is not suited to horticultural crops. If these crops were grown, special management and careful plant selection would be required. Crop residue management is needed to maintain the content of organic matter and improve tilth. The soil can be tilled throughout a wide range in moisture content. Applications of lime and fertilizer improve yields.

Urban uses may be affected by several soil factors. Extensive excavation and filling may be needed during construction because of the slope. The rapid permeability in the topsoil keeps septic tank absorption fields from operating satisfactorily. The slope hinders the construction of local roads and streets. Coating pipe and treating concrete minimize corrosion. Droughtiness and the slope may be limitations on sites for lawns. Seepage may be a problem in pond reservoir areas. Proper design and careful installation of structures can help to overcome or modify any hazards or limitations.

The suitability of this soil for most recreational uses is limited by the sandy surface layer and the slope. The native vegetation provides good habitat for game birds, songbirds, small furbearers, and deer. Seed-producing grasses, forbs, shrubs, and nut-bearing trees provide ample food and shelter for most kinds of wildlife. Whitetail deer, bobwhite quail, mourning dove, and songbirds feed in the many open pastures and fields. They benefit from the security of the surrounding woodland cover.

The capability subclass is 6e. The woodland ordination symbol is 8S.

EaC—Eastwood very fine sandy loam, 1 to 5 percent slopes. This gently sloping soil is on ridges and side slopes in the uplands. The surface is plane or weakly convex. Individual areas range from 15 to 1,000 acres in size and average about 200 acres.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
- 0 to 3 inches, very strongly acid, dark yellowish brown very fine sandy loam

Subsurface layer:
- 3 to 8 inches, very strongly acid, light yellowish brown very fine sandy loam

Subsoil:
- 8 to 12 inches, very strongly acid, red clay
- 12 to 23 inches, very strongly acid, red clay that has light brownish gray mottles
- 23 to 28 inches, very strongly acid, red silty clay that has light gray mottles
- 28 to 37 inches, very strongly acid, yellowish brown silty clay that has red and light brownish gray mottles
- 37 to 46 inches, very strongly acid, light yellowish brown silty clay loam that has light brownish gray and brownish yellow mottles
- 46 to 51 inches, very strongly acid, yellowish brown loam that has light brownish gray and yellowish brown mottles

Substratum:
- 51 to 72 inches, light yellowish brown, weakly consolidated siltstone that has a texture of silty clay loam and has brownish yellow mottles

Important soil properties—

Available water capacity: high
Permeability: very slow
Drainage: moderately well drained
Runoff: medium
Water table: at a depth of more than 6 feet throughout the year
Root zone: deep
Shrink-swell potential: high in the subsoil
Hazard of water erosion: moderate (K factor—.55; T factor—a maximum allowance of 4 tons per acre per year)
Prime farmland: no (because of the pH and the restricted permeability)

Included with this soil in mapping are small areas of Elrose, Iuka, Latex, Mathiston, Metcalf, Meth, Sardis, and Scottsville soils. Elrose soils are loamy in the upper part of the subsoil. They are on ridges. Metcalf soils have a gray subsoil. They are on nearly level, concave flats at the head of drainageways. Iuka, Mathiston, and Sardis soils are loamy. They are on flood plains. Latex and Scottsville soils are loamy in the upper part of subsoil and are clayey in the lower part of the subsoil. They are in landscape positions similar to those of the Eastwood soil or are in the slightly higher positions. Meth soils have a subsoil that is less sticky and plastic than that of the Eastwood soil. They are in landscape positions similar to those of the Eastwood soil or are in the slightly higher convex areas. Also included are a few small areas of soils that have slopes of more than 5 percent, some areas where the surface layer is silt loam to fine sandy loam, and a few areas near the Louisiana State border where the solum is more than 60 inches thick and reaction is moderately alkaline below a depth of 60 inches.

The contrasting Iuka, Latex, Mathiston, Metcalf, and Sardis soils make up less than 5 percent of the map unit. The other included soils are similar to the Eastwood soil and make up less than 15 percent of the map unit.

Areas of the Eastwood soil are used mainly as woodland or pasture.

The wooded areas support hardwoods and pine. The commercial trees used for timber production are loblolly pine, slash pine, and shortleaf pine. Yields of loblolly pine are 360 board feet per acre per year over a 50-year period. Based on a 50-year site curve, the mean site index for loblolly pine is 93.

Reforestation in cutover areas of loblolly pine and shortleaf pine occurs naturally where seed trees are in the stand. Reforestation also can be achieved by planting loblolly pine seedlings. When openings are made in the canopy, invading brush and hardwood species that are not controlled can delay the establishment or regeneration of pine. Selective thinning, removal of undesirable trees, and protection from wildfire increase yields.

Some problems affect timber production. Using standard equipment that has wheels or tracks causes rutting and compaction when the soil is moist and displacement of the surface layer when the soil is dry. Because of the clayey subsoil, puddling can occur during wet periods, making unsurfaced roads and skid trails slick and almost impassable.

This soil is subject to excessive erosion unless it is protected. Using low-pressure ground equipment minimizes soil damage and erosion and helps to maintain productivity. The proper design and careful construction of haul roads and care in the selection of sites for culverts and turnouts help to control erosion. Skid trails, firebreaks, and other areas where the surface is disturbed are subject to rilling and gullying. Revegetating the spoil from excavations reduces the hazard of rill and gully erosion.

This soil is well suited to pasture grasses for grazing or hay. No major limitations affect these uses. Suitable pasture grasses include bahiagrass, coastal bermudagrass, common bermudagrass, and weeping lovegrass. Low inherent soil fertility is a limitation. The soil is seasonally wet or droughty, and the relationship between plant growth and soil moisture is fair or poor. Applications of fertilizer and lime and controlled grazing improve yields and help to control erosion. Cool-season legumes, such as arrowleaf clover, crimson clover, white clover, singletary peas, and hairy vetch, provide winter forage and add nitrogen to the soil.

This soil is suitable for peas, corn, and grain sorghum. It is susceptible to excessive erosion because of the texture of the surface layer and the slope. The very slowly permeable subsoil restricts the movement of air and water through the soil. Conservation tillage, terraces, and contour farming help to prevent excessive erosion. Crop growth may be limited by a lack of water during dry periods in summer. The soil generally is not suited to horticultural crops. If these crops were grown, special management and careful plant selection would be required. Crop residue management is needed to maintain the content of organic matter and improve tilth. The soil can be tilled only within a narrow range in moisture content. Applications of lime and fertilizer improve yields.

Urban uses may be affected by several soil factors. Because of the high shrink-swell potential in the subsoil, building foundations can crack. The very slow permeability in the subsoil keeps septic tank absorption fields from operating satisfactorily. Low strength and the shrink-swell potential are problems on sites for local roads and streets. Coating pipe and treating concrete minimize corrosion. The limitations affecting lawns are slight. Those that affect pond reservoir areas also are slight (fig. 6). Proper design and careful installation of structures can help to overcome or modify any hazards or limitations.

The suitability of this soil for most recreational uses is limited by the restricted permeability in the subsoil. The native vegetation provides good habitat for game birds, songbirds, small furbearers, and deer. Seed-producing grasses, forbs, shrubs, and nut-bearing trees provide ample food and shelter for most kinds of wildlife. Whitetail deer, bobwhite quail, mourning dove, and songbirds feed in the many open pastures and

Figure 6.—A farm pond in an area of Eastwood very fine sandy loam, 1 to 5 percent slopes.

fields. They benefit from the security of the surrounding woodland cover.

The capability subclass is 4e. The woodland ordination symbol is 10C.

EaE—Eastwood very fine sandy loam, 5 to 20 percent slopes. This moderately sloping to moderately steep soil is on side slopes in the uplands. The surface is plane or weakly convex. Individual areas range from 15 to 2,000 acres in size and average about 300 acres.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 4 inches, very strongly acid, grayish brown very fine sandy loam that has pale brown mottles

Subsoil:

4 to 8 inches, very strongly acid, red clay that has light gray mottles

8 to 17 inches, very strongly acid, yellowish red clay that has light gray and red mottles

17 to 24 inches, extremely acid, reddish yellow clay that has light gray, red, and brownish yellow mottles

24 to 35 inches, extremely acid, light gray clay loam that has brownish yellow, strong brown, and reddish yellow mottles

35 to 46 inches, extremely acid, mottled white and strong brown silt loam that has light gray mottles

Substratum:

46 to 55 inches, extremely acid, light yellowish brown silt loam that has light gray and yellowish brown mottles

55 to 60 inches, extremely acid, light gray, weakly consolidated siltstone that has a texture of silt loam and has brownish yellow and strong brown mottles

Important soil properties—

Available water capacity: moderate
Permeability: very slow
Drainage: moderately well drained

Runoff: rapid
Water table: at a depth of more than 6 feet throughout the year
Root zone: deep over weakly consolidated siltstone
Shrink-swell potential: high in the subsoil
Hazard of water erosion: severe (K factor—.55; T factor—a maximum allowance of 4 tons per acre per year)
Prime farmland: no (because of the pH, the slope, the hazard of water erosion, and the restricted permeability)

Included with this soil in mapping are small areas of Bernaldo, Bonn, Iuka, Latex, Mathiston, Meth, Sardis, and Scottsville soils. Bernaldo soils have a loamy subsoil. They are in the higher gently sloping areas. Bonn soils have a loamy subsoil and have high concentrations of sodium salts in the subsoil. They are on low terraces. Iuka, Mathiston, and Sardis soils are on bottom land and are subject to flooding. Iuka soils have a coarse-loamy, stratified subsoil. Mathiston and Sardis soils have a silty subsoil. Latex and Scottsville soils are loamy in the upper part of subsoil and are clayey in the lower part of the subsoil. They are in the higher nearly level to gently sloping areas. Meth soils have a subsoil that is less sticky and plastic than that of the Eastwood soil. They are on the higher ridgetops. Also included are some areas where slopes are less than 5 percent, some areas where the solum is less than 40 inches thick, and some areas where the surface layer is silt loam or fine sandy loam.

The contrasting Bernaldo, Bonn, Iuka, Latex, Mathiston, and Sardis soils make up less than 5 percent of the map unit. The other included soils are similar to the Eastwood soil and make up less than 15 percent of the map unit.

Areas of the Eastwood soil are used mainly as woodland or pasture.

The wooded areas support hardwoods and pine. The commercial trees used for timber production are loblolly pine, slash pine, and shortleaf pine. Yields of loblolly pine are 290 board feet per acre per year over a 50-year period. Based on a 50-year site curve, the mean site index is 86 for loblolly pine and 77 for shortleaf pine.

Reforestation in cutover areas of loblolly pine and shortleaf pine occurs naturally where seed trees are in the stand. Reforestation also can be achieved by planting loblolly pine seedlings. When openings are made in the canopy, invading brush and hardwood species that are not controlled can delay the establishment or regeneration of pine. Selective thinning, removal of undesirable trees, and protection from wildfire increase yields.

Some problems affect timber production. Using standard equipment that has wheels or tracks causes rutting and compaction when the soil is moist and displacement of the surface layer when the soil is dry. Because of the clayey subsoil, puddling can occur during wet periods, making unsurfaced roads and skid trails slick and almost impassable. The slope can limit the use of equipment.

Because of the slope and the texture of the surface layer, excessive erosion can occur unless the soil is protected. Using low-pressure ground equipment minimizes soil damage and erosion and helps to maintain productivity. The proper design and careful construction of haul roads and care in the selection of sites for culverts and turnouts help to control erosion. Skid trails, firebreaks, and other areas where the surface is disturbed are subject to rilling and gullying. Revegetating the spoil from excavations reduces the hazard of rill and gully erosion.

This soil is well suited to pasture grasses for grazing or hay. No major limitations affect these uses. Suitable pasture grasses include bahiagrass, bermudagrass, and weeping lovegrass. Low inherent soil fertility is a limitation. The soil is seasonally wet or droughty, and the relationship between plant growth and soil moisture is fair or poor. Possible past erosion, the slope, and a slow rate of water infiltration combine to intensify management problems. Because of good surface drainage, the soil can be grazed in winter. Applications of fertilizer and lime and controlled grazing improve yields and help to control erosion. Cool-season legumes, such as arrowleaf clover, crimson clover, singletary peas, and hairy vetch, provide winter forage and add nitrogen to the soil.

This soil is not suitable for cropping because of the slope and the susceptibility to erosion.

Urban uses may be affected by several soil factors. Because of the high shrink-swell potential in the subsoil, building foundations can crack. Extensive excavation and filling may be needed during construction because of the slope. The very slow permeability in the subsoil and the slope keep septic tank absorption fields from operating satisfactorily. Low strength, the high shrink-swell potential, and the slope are problems on sites for local roads and streets. Coating pipe and treating concrete minimize corrosion. The limitations affecting lawns are slight. Those that affect pond reservoir areas also are slight. Proper design and careful installation of structures can help to overcome or modify any hazards or limitations.

The suitability of this soil for most recreational uses is limited by the restricted permeability in the subsoil and the slope. The native vegetation provides good habitat for game birds, songbirds, small furbearers, and

deer. Seed-producing grasses, forbs, shrubs, and nut-bearing trees provide ample food and shelter for most kinds of wildlife. Whitetail deer, bobwhite quail, mourning dove, and songbirds feed in the many open pastures and fields. They benefit from the security of the surrounding woodland cover.

The capability subclass is 6e. The woodland ordination symbol is 9C.

EbB—Elrose fine sandy loam, 1 to 3 percent slopes. This very gently sloping soil is on interstream divides occurring as ridges in the uplands. The divides commonly separate small watersheds. Individual areas range from 15 to 800 acres in size and average about 75 acres.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 5 inches, slightly acid, brown fine sandy loam

Subsurface layer:
5 to 11 inches, neutral, brown fine sandy loam that has strong brown mottles

Subsoil:
11 to 19 inches, neutral, yellowish red sandy clay loam
19 to 28 inches, slightly acid, red clay loam
28 to 44 inches, medium acid, red clay loam that has brownish yellow mottles
44 to 69 inches, medium acid, red clay that has brownish yellow and yellowish brown mottles
69 to 80 inches, strongly acid, red clay that has brownish yellow and yellowish brown mottles

Important soil properties—

Available water capacity: high
Permeability: moderate
Drainage: well drained (the surface dries quickly after rains)
Runoff: medium
Water table: at a depth of more than 6 feet
Root zone: deep
Shrink-swell potential: low in the upper part of the subsoil and moderate in the lower part
Hazard of water erosion: slight (K factor—.28; T factor—a maximum allowance of 5 tons per acre per year)
Prime farmland: yes (all the soil properties meet the criteria)

Included with this soil in mapping are small areas of Bernaldo, Eastwood, Latex, Meth, Scottsville, and Wolfpen soils. Bernaldo soils have a brown, loamy subsoil. They are in the slightly lower convex areas. Eastwood soils have a red to gray, clayey subsoil. They are on gently sloping to moderately steep side slopes. Latex and Scottsville soils are brown and loamy in the upper part of the subsoil and are red and gray and clayey in the lower part of the subsoil. They are in the lower landscape positions. Meth soils have a red, clayey subsoil. They are on the slightly higher ridges. Wolfpen soils have a surface layer of loamy fine sand that is more than 20 inches thick. Also included, generally on the slightly higher knolls, are a few areas where the surface layer is loamy fine sand.

The contrasting Eastwood, Latex, and Scottsville soils make up less than 5 percent of the map unit. The other included soils are similar to the Elrose soil and make up less than 10 percent of the map unit.

Areas of the Elrose soil are used mainly as pasture. Several areas are used as woodland. A few areas are used for nonirrigated crops or for homesite development.

The wooded areas support hardwoods and pine. The commercial trees used for timber production are loblolly pine, slash pine, and shortleaf pine. Yields of loblolly pine are 370 board feet per acre per year over a 50-year period. Based on a 50-year site curve, the mean site index is 94 for loblolly pine and 85 for shortleaf pine.

Reforestation in cutover areas of loblolly pine and shortleaf pine occurs naturally where seed trees are in the stand. Reforestation also can be achieved by planting loblolly pine seedlings. When openings are made in the canopy, invading brush species that are not controlled can delay the establishment or regeneration of pine. Selective thinning, removal of undesirable trees, and protection from wildfire increase yields.

This soil is well suited to timber. No major limitations affect timber production. Using standard equipment that has wheels or tracks causes rutting and compaction when the soil is moist and displacement of the surface layer when the soil is dry. Puddling can occur during wet periods, making unsurfaced roads and skid trails slick and almost impassable.

Using low-pressure ground equipment minimizes soil damage and erosion and helps to maintain productivity. The proper design and careful construction of haul roads and care in the selection of sites for culverts and turnouts help to control erosion. Skid trails, firebreaks, and other areas where the surface is disturbed are subject to rilling and gullying. Revegetating the spoil from excavations reduces the hazard of rill and gully erosion.

This soil is well suited to pasture grasses for grazing or hay. No major limitations affect these uses. The most commonly grown pasture grasses are bahiagrass, common bermudagrass, and coastal bermudagrass.

Low inherent soil fertility is a limitation. Applications of fertilizer and lime and controlled grazing improve yields. Cool-season legumes, such as vetch and arrowleaf clover, provide winter forage and add nitrogen to the soil.

The main suitable crops grown on this soil are corn, grain sorghum, and truck crops, such as peas. Where the plant cover is inadequate, erosion is a hazard. Conservation tillage, terraces, and contour farming help to prevent excessive erosion. Crop growth may be limited by an insufficient amount of water during dry periods in summer. The soil is suited to several kinds of horticultural crops. Crop residue management is needed to maintain the content of organic matter and improve tilth. The soil can be tilled throughout a wide range in moisture content. Applications of lime and fertilizer improve yields.

This soil is suited to most urban uses. Proper design and careful installation are needed to overcome seepage in pond reservoir areas. The soil should be strengthened when it is used as base material for local roads and streets. Properly designing foundations helps to overcome the moderate shrink-swell potential in the subsoil. Uncoated underground steel and concrete should be protected from corrosion.

This soil is well suited to recreational uses and provides habitat for many wildlife species. Whitetail deer, bobwhite quail, mourning dove, many songbirds, and other small animals feed in the open pastures and fields. They benefit from the security of the surrounding woodland cover.

The capability subclass is 2e. The woodland ordination symbol is 10A.

EcA—Erno-Cart complex, 0 to 2 percent slopes. These nearly level soils are on terraces along the major streams. They are on flats that are mounded. Individual areas are generally long and narrow and parallel drainageways. They range from 20 to 250 acres in size.

The Erno soil is on nearly level to slightly convex flats between mounds. The Cart soil is on circular mounds that are 75 to 200 feet wide and are 2 to 5 feet higher than the Erno soil.

This complex is about 50 percent Erno soil, 35 percent Cart soil, and 15 percent other soils. Individual areas range from 40 to 60 percent Erno soil, from 30 to 50 percent Cart soil, and from 5 to 25 percent other soils. The Erno and Cart soils occur as areas so intricately mixed that mapping them separately is not practical at the scale selected for mapping.

The typical sequence, depth, and composition of the layers of the Erno soil are as follows—

Surface layer:
- 0 to 4 inches, very strongly acid, grayish brown very fine sandy loam

Subsurface layer:
- 4 to 9 inches, very strongly acid, brown very fine sandy loam

Subsoil:
- 9 to 15 inches, strongly acid, strong brown loam
- 15 to 26 inches, medium acid, strong brown clay loam that has reddish and yellowish mottles
- 26 to 36 inches, strongly acid, yellowish brown loam that has reddish mottles
- 36 to 50 inches, strongly acid, yellowish brown, brittle loam that has reddish mottles
- 50 to 75 inches, strongly acid, yellowish brown, brittle loam that has reddish mottles
- 75 to 88 inches, very strongly acid, yellowish brown, brittle fine sandy loam that has gray mottles

Important properties of the Erno soil—

Available water capacity: moderate
Permeability: slow
Drainage: well drained
Runoff: slow
Water table: perched at a depth of 2.5 to 4.0 feet, or directly above the brittle part of the subsoil, during some periods in winter
Root zone: very deep
Shrink-swell potential: low
Hazard of water erosion: slight (K factor—.49; T factor—a maximum allowance of 3 tons per acre per year)
Prime farmland: yes (all the soil properties meet the criteria)

The typical sequence, depth, and composition of the layers of the Cart soil are as follows—

Surface layer:
- 0 to 3 inches, very strongly acid, dark yellowish brown very fine sandy loam

Subsurface layer:
- 3 to 11 inches, very strongly acid, yellowish brown very fine sandy loam
- 11 to 22 inches, medium acid, brown very fine sandy loam

Subsoil:
- 22 to 28 inches, medium acid, yellowish brown loam that has tongues of clean sand
- 28 to 43 inches, medium acid, strong brown loam that has streaks of clean sand
- 43 to 80 inches, strongly acid, yellowish brown and brownish yellow, brittle loam that has brownish and reddish mottles

Important properties of the Cart soil—

Available water capacity: moderate
Permeability: slow
Drainage: well drained
Runoff: slow
Water table: at a depth of about 3 to 4 feet, or directly above the brittle part of the subsoil, during winter and below a depth of 6 feet during the rest of the year
Root zone: deep
Shrink-swell potential: low
Hazard of water erosion: slight (K factor—.55; T factor—a maximum allowance of 5 tons per acre per year)
Prime farmland: yes (all the soil properties meet the criteria)

Included with these soils in mapping are small areas of Bernaldo, Bienville, Guyton, Iuka, Latch, Latex, Metcalf, and Scottsville soils. Bernaldo soils are in the higher areas. They do not have a fragipan. Bienville soils have a surface layer of loamy fine sand. They are in the lower areas. Guyton soils are poorly drained and have gray colors. Iuka soils are in frequently flooded drainageways. Latch soils are on low terraces. They have a thick surface layer of loamy fine sand. Latex, Metcalf, and Scottsville soils are clayey in the lower part of the subsoil. They are in the higher landscape positions. Also included are soils that have a surface layer of silt loam to fine sandy loam.

The contrasting Bienville, Guyton, Iuka, Metcalf, and Scottsville soils make up less than 5 percent of the map unit. The other included soils are similar to the Erno and Cart soils and make up less than 10 percent of the map unit.

Areas of the Erno and Cart soils are used mainly as woodland or pasture.

The wooded areas support hardwoods and pine. The commercial trees used for timber production are loblolly pine, slash pine, and shortleaf pine. Yields of loblolly pine are 430 board feet per acre per year over a 50-year period on the Erno soil and 462 board feet per acre per year over a 50-year period on the Cart soil. Based on a 50-year site curve, the mean site index for loblolly pine is 100 on the Erno soil and 102 on the Cart soil. The mean site index for shortleaf pine is 90 on the Erno soil and 87 on the Cart soil.

Reforestation in cutover areas of loblolly pine and shortleaf pine occurs naturally where seed trees are in the stand. Reforestation also can be achieved by planting loblolly pine seedlings. When openings are made in the canopy, invading brush species that are not controlled can delay the establishment or regeneration of pine. Selective thinning, removal of undesirable trees, and protection from wildfire increase yields.

These soils are well suited to timber. No major limitations affect timber production. Using standard equipment that has wheels or tracks causes rutting and compaction when the soils are moist and displacement of the surface layer when the soils are dry. Puddling can occur during wet periods, making unsurfaced roads and skid trails slick and almost impassable.

Using low-pressure ground equipment minimizes soil damage and erosion and helps to maintain productivity. The proper design and careful construction of haul roads and care in the selection of sites for culverts and turnouts help to control erosion. Skid trails, firebreaks, and other areas where the surface is disturbed are subject to rilling and gullying. Revegetating the spoil from excavations reduces the hazard of rill and gully erosion.

These soils are well suited to pasture grasses for grazing or hay. No major limitations affect these uses. The most commonly grown pasture grasses are bahiagrass, common bermudagrass, and coastal bermudagrass. Low inherent soil fertility is a limitation. Applications of fertilizer and lime and controlled grazing improve yields. Cool-season legumes, such as vetch and arrowleaf clover, provide winter forage and add nitrogen to the soils.

These soils are suited to a variety of truck crops, including peas, corn, and grain sorghum. Where the plant cover is inadequate, erosion is a hazard. The numerous mounds interfere with tillage. Conservation tillage, terraces, and contour farming help to prevent excessive erosion. Crop growth may be limited by an insufficient amount of water during dry periods in summer. The soils are suited to several kinds of horticultural crops. Crop residue management is needed to maintain the content of organic matter and improve tilth. The soils can be tilled throughout a wide range in moisture content. Applications of lime and fertilizer improve yields.

Several soil factors may affect most urban uses. Proper design and careful installation are needed to overcome the moderately slow permeability and wetness on sites for septic tank absorption fields and seepage in pond reservoir areas. Uncoated underground steel and concrete should be protected from corrosion. No major limitations affect local roads or the foundations of most houses.

These soils are suited to recreational uses and provide habitat for many wildlife species. The moderately slowly permeable subsoil limits recreational uses. Whitetail deer, bobwhite quail, mourning dove, many songbirds, and other small animals feed in the open pastures and fields. They benefit from the security of the surrounding woodland cover.

The capability subclass is 2e. The woodland ordination symbol is 11A.

Es—Estes clay, occasionally flooded. This nearly level soil is on wide flood plains and in oxbows of the Sabine River. Slopes are 0 to 1 percent. Individual areas are extensive and range from 300 to a few thousand acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 4 inches, very strongly acid, dark brown clay

Subsoil:
4 to 12 inches, very strongly acid, pale brown clay that has common strong brown mottles
12 to 38 inches, very strongly acid, light brownish gray clay that has common strong brown mottles
38 to 65 inches, very strongly acid, light brownish gray clay that has many strong brown and yellowish brown mottles

Substratum:
65 to 80 inches, extremely acid, light brownish gray clay loam that has common strong brown and many light gray mottles

Important soil properties—

Available water capacity: high
Permeability: very slow
Drainage: somewhat poorly drained
Runoff: very slow
Water table: perched within a depth of 2 feet during winter and spring; ponding for several days to several weeks
Flooding: usually at least once in 10 years, occurring mainly in winter and spring (a few inches to about 3 feet deep) for brief periods
Root zone: very deep
Shrink-swell potential: high
Hazard of water erosion: slight (K factor—.32; T factor—a maximum allowance of 5 tons per acre per year)
Prime farmland: no (because of the pH, the wetness, and the restricted permeability)

Included with this soil in mapping are small areas of Cart, Iuka, Guyton, Latch, Mantachie, Mooreville, Nugent, and Socagee soils. Cart soils have a fragipan. They are in the higher mounded areas and are not subject to flooding. Iuka soils are moderately well drained and are in the slightly higher areas along stream channels. Guyton and Latch soils are on the slightly higher terraces. Guyton soils are loamy, and Latch soils have a sandy surface layer that is 40 to 78 inches thick. Mantachie and Mooreville soils are loamy. They are on channel ridges and adjacent to old oxbows. Nugent soils are sandy and occur as point bars along the Sabine River. Socagee soils are loamy. They are in landscape positions similar to those of the Estes soil.

The contrasting Cart, Iuka, Latch, and Nugent soils make up less than 5 percent of the map unit. The other included soils are similar to the Estes soil and make up less than 20 percent of the map unit.

Areas of the Estes soil are used mainly as woodland. A few areas are used as pasture.

The wooded areas mainly support hardwoods. Pine grows in a few areas. The commercial trees used for timber production are sweetgum, willow oak, and water oak. Yields of sweetgum are 360 board feet per acre per year over a 50-year period. Based on a 50-year site curve, the mean site index is 93 for sweetgum and for bottom-land oaks.

Reforestation in cutover areas of bottom-land oaks occurs naturally where mast trees are in the stand. When openings are made in the canopy, invading brush and undesirable hardwood species that are not controlled can delay the establishment or regeneration of desirable hardwoods or pine. Selective thinning and removal of undesirable trees increase yields.

Wetness is the most severe limitation affecting timber production and harvesting. The seasonal high water table restricts the use of equipment to midsummer, when the soil is dry. Seedling survival is restricted in those years when flooding occurs. It is poor for some species in areas where ponding occurs. The seasonal high water table restricts root development. Trees are occasionally subject to windthrow during periods when the soil is wet.

Using standard equipment that has wheels or tracks causes rutting and compaction when the soil is moist and displacement of the surface layer when the soil is dry. Puddling can occur during wet periods, making unsurfaced roads and skid trails slick and impassable. Using low-pressure ground equipment minimizes soil damage and erosion and helps to maintain productivity. The proper design and careful construction of haul roads and care in the selection of sites for culverts and turnouts help to control erosion. Skid trails, firebreaks, and other areas where the surface is disturbed are subject to rilling and gullying. Revegetating the spoil from excavations reduces the hazard of rill and gully erosion.

Suitable pasture grasses include bahiagrass, Dallisgrass, and tall fescue. Low inherent soil fertility is a limitation. Wetness and flooding limit the use of some kinds of equipment, limit grass production, and restrict grazing during some periods in most years. Applications of fertilizer and lime, controlled grazing, and a surface drainage system improve yields and help to control

erosion. Cool-season legumes, such as white clover and singletary peas, provide winter forage and add nitrogen to the soil.

This soil is unsuitable for cropping. The surface layer is wet for long periods in winter and spring. The wetness can delay planting and harvesting. Occasional flooding in spring can disrupt planting and damage growing crops. Applications of fertilizer and lime and a surface drainage system improve yields. Proper management of crop residue helps to maintain the content of organic matter, improves tilth, and minimizes surface crusting and erosion. The soil is too wet for most horticultural crops.

This soil is unsuitable for most urban uses. Wetness and flooding keep septic tank absorption fields from operating properly. They are severe limitations on sites for buildings and for local roads and streets. Overcoming these limitations generally is impractical. Coating pipe and treating concrete minimize corrosion.

The suitability of this soil for most recreational uses is limited because of wetness and flooding. The soil provides habitat for many animals. Ducks and other waterfowl use ponded areas. Deer and squirrels can find adequate food and cover. Many songbirds and the pileated woodpecker use areas of this soil for nesting.

The capability subclass is 4w. The woodland ordination symbol is 8W.

GcA—Guyton-Cart complex, 0 to 1 percent slopes. These soils are on nearly level and depressional, mounded stream terraces. They are on slightly concave flats. Oval mounds dot the landscape. Some areas are occasionally flooded during periods of peak runoff. Individual areas are generally long and narrow and parallel drainageways. They range from 20 to 1,000 acres in size and average about 100 acres.

The Guyton soil is in low, wet depressions that are about 25 to 1,000 feet wide and are sinuous and connected. The Cart soil typically is on circular mounds that are 2 to 5 feet high, 40 to 125 feet in diameter, and 50 to 250 feet apart.

This complex is about 55 percent Guyton soil, 30 percent Cart soil, and 15 percent other soils. Individual areas range from 40 to 75 percent Guyton soil, from 15 to 40 percent Cart soil, and from 5 to 25 percent other soils. The Guyton and Cart soils occur as areas so intricately mixed that mapping them separately is not practical at the scale selected for mapping.

The typical sequence, depth, and composition of the layers of the Guyton soil are as follows—

Surface layer:
- 0 to 2 inches, extremely acid, dark grayish brown silt loam that has yellowish brown mottles

Subsurface layer:
- 2 to 9 inches, extremely acid, light brownish gray silt loam that has yellowish brown and yellowish red mottles
- 9 to 17 inches, extremely acid, light brownish gray silt loam that has brownish yellow and yellowish brown mottles

Subsoil:
- 17 to 29 inches, extremely acid, light brownish gray silty clay loam that has yellowish brown and yellowish red mottles and has vertical streaks of sand
- 29 to 39 inches, extremely acid, light brownish gray silty clay loam that has yellowish brown and pale brown mottles and has vertical streaks of sand
- 39 to 58 inches, very strongly acid, light gray loam that has strong brown mottles
- 58 to 72 inches, strongly acid, light gray loam that has light yellowish brown and reddish yellow mottles

Substratum:
- 72 to 80 inches, medium acid, light brownish gray loam that has yellow and strong brown mottles

Important properties of the Guyton soil—

Available water capacity: high
Permeability: slow
Drainage: poorly drained
Runoff: slow; water standing on the surface for several days during wet periods
Water table: within 18 inches of the surface during wet periods in winter and spring
Ponding: can occur for short periods immediately after heavy rainfall
Root zone: very deep
Shrink-swell potential: low
Hazard of water erosion: slight (K factor— 43; T factor— a maximum allowance of 5 tons per acre per year)
Prime farmland: no (because of the wetness and a low pH)

The typical sequence, depth, and composition of the layers of the Cart soil are as follows—

Surface layer:
- 0 to 3 inches, very strongly acid, brown very fine sandy loam

Subsurface layer:
- 3 to 17 inches, very strongly acid, yellowish brown very fine sandy loam
- 17 to 23 inches, very strongly acid, light yellowish brown loam

Subsoil:

23 to 33 inches, very strongly acid, brownish yellow loam that has pale brown vertical streaks of sand

33 to 50 inches, very strongly acid, brownish yellow loam that has light yellowish brown and strong brown mottles and has pale brown vertical streaks of sand

50 to 70 inches, very strongly acid, brownish yellow loam that has light yellowish brown mottles and has light brownish gray vertical streaks of sand, surrounded by a brittle matrix

70 to 80 inches, very strongly acid, light gray clay loam that has brownish yellow and reddish yellow mottles and has light gray vertical streaks of sand

Important properties of the Cart soil—

Available water capacity: moderate
Permeability: slow
Drainage: well drained (the surface dries quickly after rains)
Runoff: slow
Water table: at a depth of about 3 to 4 feet, or directly above the brittle part of the subsoil, during winter and below a depth of 6 feet during the rest of the year
Root zone: very deep
Shrink-swell potential: low in the subsoil
Hazard of water erosion: slight (K factor—.55; T factor—a maximum allowance of 5 tons per acre per year)
Prime farmland: not considered prime farmland in this map unit, which is dominated by a soil that does not meet the criteria for prime farmland

Included with these soils in mapping are small areas of Bonn, Erno, Latch, Metcalf, Mathiston, Mollville, Sardis, Scottsville, and Socagee soils. Bonn soils have high concentrations of sodium salts in the subsoil. They are in positions on terraces similar to those of the Guyton and Cart soils. Erno soils are brown in the upper part of the subsoil. They are in the slightly higher landscape positions. Latch soils have a thick, sandy surface layer. They are on long mounds in the slightly higher areas. Metcalf and Scottsville soils are brown and gray and loamy in the upper part of the subsoil and are gray and clayey in the lower part of the subsoil. They are in the higher landscape positions. Mathiston, Sardis, and Socagee soils are on bottom land and are frequently flooded. Mollville soils have a gray, loamy subsoil. They are in landscape positions similar to those of the Guyton and Cart soils. Also included are some areas of soils on low terraces that may be occasionally flooded, soils that have a surface layer of loam or very fine sandy loam, and soils that have a clayey subsoil.

The contrasting Latch, Mathiston, Sardis, and Socagee soils make up less than 10 percent of the map unit. The other included soils are similar to the Guyton and Cart soils and commonly make up about 5 to 15 percent of the map unit.

Most areas of the Guyton and Cart soils are used as woodland. A few small areas have been cleared and are used as improved pasture.

The wooded areas support hardwoods and pine. The commercial trees used for timber production are willow oak and loblolly pine. Yields of loblolly pine are 330 board feet per acre per year over a 50-year period on the Guyton soil and 462 board feet per acre per year over a 50-year period on the Cart soil. Based on a 50-year site curve, the mean site index for loblolly pine is 90 on the Guyton soil. On the Cart soil, the mean site index is 102 for loblolly pine and slash pine and 87 for shortleaf pine.

Reforestation in cutover areas of loblolly pine, shortleaf pine, and willow oak occurs naturally where seed trees are in the stand. Reforestation also can be achieved by planting loblolly pine seedlings. It is needed in some areas of the Guyton soil because of the seedling mortality caused by wetness. When openings are made in the canopy, invading brush species that are not controlled can delay the establishment or regeneration of pine. Selective thinning, removal of undesirable trees, and protection from wildfire increase yields.

Wetness is the most severe limitation affecting timber production and harvesting. The seasonal high water table in the Guyton soil restricts the use of equipment to midsummer, when the soil is dry. Seedling survival is poor in areas where ponding occurs. The seasonal high water table restricts root development. Trees are occasionally subject to windthrow during wet periods. Few limitations affect timber production on the mounded Cart soil. The trees should be harvested during dry periods, when equipment can be used more easily on the Guyton soil.

Using standard equipment that has wheels or tracks causes rutting and compaction when the soils are moist and displacement of the surface layer when the soils are dry. Puddling can occur during wet periods, making unsurfaced roads and skid trails slick and impassable. Using low-pressure ground equipment minimizes soil damage and erosion and helps to maintain productivity. The proper design and careful construction of haul roads and care in the selection of sites for culverts and turnouts help to control erosion. Skid trails, firebreaks, and other areas where the surface is disturbed are subject to rilling and gullying. Revegetating the spoil from excavations reduces the hazard of rill and gully erosion.

The most commonly grown improved grasses include bahiagrass, common bermudagrass, and tall fescue. Poor drainage and slow permeability are limitations. Low inherent soil fertility also is a limitation. Seedbeds cannot be easily prepared or kept in good tilth. Wetness limits the use of some kinds of equipment. The soils can be worked only within a narrow range in moisture content. Applications of fertilizer and lime, controlled grazing, and a surface drainage system improve yields. Cool-season legumes, such as white clover and singletary peas, provide winter forage and add nitrogen to the soils.

If used as cropland, these soils cannot be easily worked. The surface layer is wet for long periods in winter and spring. The wetness can delay planting and harvesting. The numerous mounds and the wetness in the areas between the mounds interfere with tillage. Applications of fertilizer and lime and a surface drainage system improve yields. Land grading and smoothing can improve surface drainage, but in places a large amount of soil must be moved. Proper management of crop residue helps to maintain the content of organic matter, improves tilth, and minimizes surface crusting and erosion. The Guyton soil is too wet for most horticultural crops. The mounded Cart soil is suited to many varieties of these crops, but the mounds occur as small areas that cannot be managed easily.

These soils are poorly suited to most urban uses. Wetness and slow permeability keep septic tank absorption fields from operating satisfactorily. Wetness and low strength are limitations on sites for buildings and for local roads and streets. Coating pipe and treating concrete minimize corrosion. Proper design and careful installation of structures can help to overcome or modify any hazards or limitations.

These soils are not suited to most recreational uses because of wetness. They provide habitat for many animals. Ducks and other waterfowl use ponded areas. Deer and squirrels can find adequate food and cover. Many songbirds and the pileated woodpecker use areas of these soils for nesting.

The Guyton soil is in capability subclass 4w and is assigned the woodland ordination symbol 9W. The Cart soil is in capability subclass 2s and is assigned the woodland ordination symbol 11A.

Iu—Iuka fine sandy loam, frequently flooded. This nearly level soil is on flood plains along small to large streams. The surface is plane or weakly convex. Individual areas range from 20 to 2,000 acres in size and average about 200 acres.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
- 0 to 4 inches, strongly acid, mottled dark grayish brown and dark yellowish brown fine sandy loam

Subsoil:
- 4 to 14 inches, very strongly acid, strong brown fine sandy loam
- 14 to 20 inches, very strongly acid, brownish yellow fine sandy loam that has grayish brown, strong brown, light yellowish brown, and very dark grayish brown mottles
- 20 to 37 inches, very strongly acid, gray silt loam that has yellowish red and strong brown mottles and has a few thin strata of loamy sand and loam
- 37 to 45 inches, very strongly acid, mottled gray, light brownish gray, light yellowish brown, and strong brown silt loam

Substratum:
- 45 to 70 inches, strongly acid, mottled pale brown, dark yellowish brown, light brownish gray, and dark brown loamy fine sand
- 70 to 80 inches, strongly acid, mottled light gray and light brown loamy sand

Important soil properties—

Available water capacity: moderate
Permeability: moderate
Drainage: moderately well drained
Runoff: slow
Water table: at a depth of 1 to 3 feet during winter and spring and below a depth of 6 feet during the rest of the year
Flooding: frequent, occurring from December through April for very brief or brief periods
Root zone: very deep
Shrink-swell potential: low
Hazard of water erosion: slight (K factor—.24; T factor—a maximum allowance of 5 tons per acre per year)
Prime farmland: no (because of the frequent flooding)

Included with this soil in mapping are small areas of Bernaldo, Bibb, Bienville, Cuthbert, Latch, Lilbert, Mantachie, and Warnock soils. Bernaldo soils have a loamy subsoil. They are in areas on terraces that are not subject to flooding. Bibb soils have a gray matrix throughout. They are in landscape positions similar to those of the Iuka soil or are in the slightly lower concave areas. Bienville and Latch soils have a thick, sandy surface layer. They are on terraces. Cuthbert soils are on side slopes adjacent to drainageways. Lilbert and Warnock soils have a loamy subsoil. They are on sloping to moderately steep side slopes. Mantachie soils have more clay in the subsoil than the Iuka soil and are not so well drained. They are in landscape positions similar to those of the Iuka soil.

Also included are soils that have a surface layer of silt loam, loam, or very fine sandy loam.

The contrasting Bernaldo, Bienville, Cuthbert, Latch, Lilbert, and Warnock soils make up less than 5 percent of the map unit. The other included soils are similar to the luka soil and make up less than 20 percent of the map unit.

Areas of the luka soil are used mainly as woodland. A few areas are used as pasture.

The wooded areas support hardwoods and pine. The commercial trees used for timber production are loblolly pine, slash pine, and shortleaf pine. Yields of loblolly pine are 590 board feet per acre per year over a 50-year period. Based on a 50-year site curve, the mean site index for loblolly pine is 110.

Reforestation in cutover areas of loblolly pine and shortleaf pine occurs naturally where seed trees are in the stand. Reforestation also can be achieved by planting loblolly pine seedlings. When openings are made in the canopy, invading brush and hardwood species that are not controlled can delay the establishment or regeneration of pine. Selective thinning, removal of undesirable trees, and protection from wildfire increase yields.

Wetness is the most severe limitation affecting timber production and harvesting. The seasonal high water table restricts the use of equipment to midsummer, when the soil is dry. Seedling mortality may be significant because of flooding and the seasonal high water table. The seasonal high water table also restricts root development. Trees are occasionally subject to windthrow during periods when the soil is wet.

Using standard equipment that has wheels or tracks causes rutting and compaction when the soil is moist and displacement of the surface layer when the soil is dry. Puddling can occur during wet periods, making unsurfaced roads and skid trails slick and almost impassable. Using low-pressure ground equipment minimizes soil damage and erosion and helps to maintain productivity. The proper design and careful construction of haul roads and care in the selection of sites for culverts and turnouts help to control erosion. Skid trails, firebreaks, and other areas where the surface is disturbed are subject to rilling and gullying. Revegetating the spoil from excavations reduces the hazard of rill and gully erosion.

Suitable pasture grasses include bahiagrass, bermudagrass, Dallisgrass, and tall fescue. The soil has good inherent fertility. The relationship between plant growth and soil moisture is good. Flooding may affect the use of equipment and grazing during some periods in most years. Applications of fertilizer and lime and controlled grazing improve yields and help to control erosion. Cool-season legumes, such as arrowleaf clover, white clover, singletary peas, and hairy vetch, provide winter forage and add nitrogen to the soil.

This soil is not suitable for cropping because of the flooding. It is suited to a limited number of horticultural crops.

This soil is unsuitable for urban uses. Wetness and flooding are severe limitations on sites for buildings, septic tank absorption fields, local roads and streets, and lawns. Overcoming these limitations generally is impractical. Low strength is a limitation on sites for local roads and streets. Coating pipe and treating concrete minimize corrosion. Seepage may be a problem in pond reservoir areas, but proper design and careful construction can help to overcome this limitation.

The suitability of this soil for most recreational uses is limited because of wetness and flooding. The soil provides habitat for many animals. Ducks and other waterfowl use ponded areas. Deer and squirrels can find adequate food and cover. Many songbirds and the pileated woodpecker use areas of this soil for nesting.

The capability subclass is 5w. The woodland ordination symbol is 12W.

KfC—Kirvin very fine sandy loam, 2 to 5 percent slopes. This gently sloping soil is on oval and oblong ridges and stream divides. The surface is slightly convex. Individual areas range from 15 to 500 acres in size and average about 75 acres.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 6 inches, slightly acid, dark brown very fine sandy loam

Subsurface layer:
6 to 14 inches, slightly acid, brown very fine sandy loam

Subsoil:
14 to 32 inches, very strongly acid, dark red clay
32 to 50 inches, very strongly acid, dark red clay that has few reddish yellow mottles

Substratum:
50 to 61 inches, very strongly acid, mottled dark red and light brownish gray, weakly consolidated sandstone and shale having a texture of clay loam

Important soil properties—

Available water capacity: moderate
Permeability: moderately slow
Drainage: well drained
Runoff: medium
Water table: at a depth of more than 6 feet

Root zone: deep over weakly consolidated, stratified sandstone and shale
Shrink-swell potential: moderate
Hazard of water erosion: moderate (K factor—.37; T factor—a maximum allowance of 4 tons per acre per year)
Prime farmland: no (because of a low pH)

Included with this soil in mapping are small areas of Bowie, Cuthbert, Lilbert, Sacul, Sawyer, Warnock, and Wolfpen soils. Bowie soils have a loamy subsoil. They are in the slightly lower plane or slightly convex areas. Cuthbert soils have a subsoil that is thinner than that of the Kirvin soil. They are on sloping to moderately steep side slopes. Sawyer soils are brownish and mottled with gray in the upper part of the subsoil and are clayey in the lower part of the subsoil. They are in the lower plane areas. Lilbert soils have a sandy surface layer that is 20 to 40 inches thick. They are in the higher landscape positions. Sacul soils have a reddish, clayey subsoil that has grayish mottles. They are in the slightly lower landscape positions. Warnock and Wolfpen soils have a sandy surface layer and a loamy subsoil. Warnock soils are in the higher sloping areas. Wolfpen soils are in the lower sloping areas. Also included are some areas where the content of ironstone fragments is more than 15 percent, by volume.

The contrasting Bowie, Lilbert, Sawyer, Warnock, and Wolfpen soils make up less than 10 percent of the map unit. The other included soils are similar to the Kirvin soil and make up less than 10 percent of the map unit.

Areas of the Kirvin soil are used mainly as woodland or pasture.

The wooded areas support hardwoods and pine. The commercial trees used for timber production are loblolly pine (fig. 7), slash pine, and shortleaf pine. Yields of loblolly pine are 280 board feet per acre per year over a 50-year period. Based on a 50-year site curve, the mean site index is 85 for loblolly pine and 75 for shortleaf pine.

Reforestation in cutover areas of loblolly pine and shortleaf pine occurs naturally where seed trees are in the stand. Reforestation also can be achieved by planting loblolly pine seedlings. When openings are made in the canopy, invading brush and hardwood species that are not controlled can delay the establishment or regeneration of pine. Selective thinning, removal of undesirable trees, and protection from wildfire increase yields.

No major limitations affect timber production. Using standard equipment that has wheels or tracks causes rutting and compaction when the soil is moist and displacement of the surface layer when the soil is dry. Because of the clayey subsoil, puddling can occur during wet periods, making unsurfaced roads and skid trails slick and almost impassable.

This soil is subject to erosion unless it is protected. Using low-pressure ground equipment minimizes soil damage and erosion and helps to maintain productivity. The proper design and careful construction of haul roads and care in the selection of sites for culverts and turnouts help to control erosion. Skid trails, firebreaks, and other areas where the surface is disturbed are subject to rilling and gullying. Revegetating the spoil from excavations reduces the hazard of rill and gully erosion.

This soil is well suited to pasture grasses for grazing or hay. No major limitations affect these uses. Suitable pasture grasses include bahiagrass, bermudagrass, and weeping lovegrass. Low inherent soil fertility is a limitation. The soil is seasonally wet or droughty, and the relationship between plant growth and soil moisture is fair or poor. Applications of fertilizer and lime and controlled grazing improve yields and help to control erosion. Cool-season legumes, such as arrowleaf clover, crimson clover, white clover, singletary peas, and hairy vetch, provide winter forage and add nitrogen to the soil.

This soil is suitable for peas, corn, and grain sorghum. It is susceptible to moderate erosion because of the texture of the surface layer and the slope. The moderately slow permeability in the subsoil restricts the movement of air and water through the soil. Conservation tillage, terraces, and contour farming help to prevent excessive erosion. Crop growth may be limited by a lack of water during dry periods in summer. The soil is suited to horticultural crops. If these crops are grown, special management and careful plant selection are required. Crop residue management is needed to maintain the content of organic matter and improve tilth. The soil can be tilled only within a narrow range in moisture content. Applications of lime and fertilizer improve yields.

Urban uses can be affected by several soil factors. Because of the moderate shrink-swell potential in the subsoil, building foundations can crack. The moderately slow permeability in the subsoil keeps septic tank absorption fields from operating satisfactorily. Low strength is a limitation on sites for local roads and streets. Coating pipe and treating concrete minimize corrosion. The limitations affecting lawns are slight. Those that affect pond reservoir areas also are slight. Proper design and careful installation of structures can help to overcome or modify any hazards or limitations.

The suitability of the soil for some recreational uses is limited by the restricted permeability in the subsoil. The native vegetation provides good habitat for game

Figure 7.—A properly managed plantation of loblolly pine in an area of Kirvin very fine sandy loam, 2 to 5 percent slopes.

birds, songbirds, small furbearers, and deer. Seed-producing grasses, forbs, shrubs, and nut-bearing trees provide ample food and shelter for most kinds of wildlife. Whitetail deer, bobwhite quail, mourning dove, and songbirds feed in the many open pastures and fields. They benefit from the security of the surrounding woodland cover.

The capability subclass is 3e. The woodland ordination symbol is 8A.

KgC—Kirvin gravelly fine sandy loam, 2 to 5 percent slopes. This gently sloping and sloping soil is on upland ridgetops, oval and oblong ridges, and stream divides. The surface is convex. Individual areas range from 15 to 500 acres in size and average about 80 acres.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 4 inches, medium acid, dark brown gravelly fine sandy loam

Subsurface layer:
4 to 8 inches, medium acid, dark brown gravelly fine sandy loam

Subsoil:
8 to 20 inches, very strongly acid, red sandy clay
20 to 32 inches, very strongly acid, red sandy clay loam that has few strong brown mottles
32 to 41 inches, very strongly acid, red sandy clay loam that has few strong brown and yellowish brown mottles and has weak strata of sandstone and shale

Substratum:
41 to 61 inches, extremely acid, mottled red, light gray, brownish yellow, and strong brown, weakly consolidated sandstone and shale having a texture of sandy clay loam

Important soil properties—

Available water capacity: moderate
Permeability: moderately slow
Drainage: well drained
Runoff: medium
Water table: at a depth of more than 6 feet
Root zone: deep over weakly consolidated sandstone and shale
Shrink-swell potential: moderate
Hazard of water erosion: moderate (K factor—.20; T factor—a maximum allowance of 4 tons per acre per year)
Prime farmland: no (because of the available water capacity and a low pH)

Included with this soil in mapping are small areas of Bowie, Cuthbert, Darbonne, Lilbert, Sacul, Warnock, and Wolfpen soils. Bowie soils have a loamy subsoil. They are in the lower landscape positions. Cuthbert soils have a subsoil that is thinner than that of the Kirvin soil. They are on side slopes. Darbonne soils have a loamy subsoil. They are in landscape positions similar to those of the Kirvin soil or are in the slightly lower positions. Sacul soils are on foot slopes. Lilbert and Wolfpen soils have a sandy surface layer that is 20 to 40 inches thick. They are in the slightly higher or lower landscape positions. Warnock soils have a surface layer that is as much as 20 inches thick and have a loamy subsoil. They are on the steeper side slopes in the higher areas. Also included are small areas of the graded Kirvin soils and some areas where stones are near outcropping ledges of iron-enriched sandstone.

The contrasting Bowie, Darbonne, Lilbert, Warnock, and Wolfpen soils make up less than 5 percent of the map unit. The other included soils are similar to the Kirvin soil and make up less than 10 percent of the map unit.

Areas of the Kirvin soil are used mainly as woodland or pasture.

The wooded areas support hardwoods and pine. The commercial trees used for timber production are loblolly pine, slash pine, and shortleaf pine. Yields of loblolly pine are 280 board feet per acre per year over a 50-year period. Based on a 50-year site curve, the mean site index is 85 for loblolly pine and 75 for shortleaf pine.

Reforestation in cutover areas of loblolly pine and shortleaf pine occurs naturally where seed trees are in the stand. Reforestation also can be achieved by planting loblolly pine seedlings. When openings are made in the canopy, invading brush and hardwood species that are not controlled can delay the establishment or regeneration of pine. Selective thinning, removal of undesirable trees, and protection from wildfire increase yields.

No major problems affect timber production. The content of gravel reduces the available water capacity and thus also reduces timber production. Using standard equipment that has wheels or tracks causes rutting and compaction when the soil is moist and displacement of the surface layer when the soil is dry. Because of the clayey subsoil, puddling can occur during wet periods, making unsurfaced roads and skid trails slick and almost impassable.

This soil is subject to erosion unless it is protected. Using low-pressure ground equipment minimizes soil damage and erosion and helps to maintain productivity. The proper design and careful construction of haul roads and care in the selection of sites for culverts and turnouts help to control erosion. Skid trails, firebreaks, and other areas where the surface is disturbed are subject to rilling and gullying. Revegetating the spoil from excavations reduces the hazard of rill and gully erosion.

This soil is well suited to pasture grasses for grazing or hay. No major limitations affect these uses. Suitable pasture grasses include bahiagrass, bermudagrass, and

weeping lovegrass. Low inherent soil fertility is a limitation. The soil is seasonally wet or droughty, and the relationship between plant growth and soil moisture is fair or poor. Applications of fertilizer and lime and controlled grazing improve yields and help to control erosion. Cool-season legumes, such as arrowleaf clover, crimson clover, white clover, singletary peas, and hairy vetch, provide winter forage and add nitrogen to the soil.

This soil is suitable for peas, corn, and grain sorghum. It is susceptible to moderate erosion because of the texture of the surface layer and the slope. The moderately slow permeability in the subsoil restricts the movement of air and water through the soil. Conservation tillage, terraces, and contour farming help to prevent excessive erosion. Crop growth may be limited by a lack of water during dry periods in summer. The soil is suited to horticultural crops. If these crops are grown, special management and careful plant selection are required. Crop residue management is needed to maintain the content of organic matter and improve tilth. The soil can be tilled only within a narrow range in moisture content. Applications of lime and fertilizer improve yields.

Urban uses can be affected by several soil factors. Because of the moderate shrink-swell potential in the subsoil, building foundations can crack. The moderately slow permeability in the subsoil keeps septic tank absorption fields from operating satisfactorily. Low strength is a problem on sites for local roads and streets. Coating pipe and treating concrete minimize corrosion. Lawns are affected by the gravel in the surface layer. The limitations affecting pond reservoir areas are slight. Proper design and careful installation of structures can help to overcome or modify any hazards or limitations.

The suitability of this soil for most recreational uses is limited by the restricted permeability in the subsoil and the content of gravel in the surface layer. The native vegetation provides good habitat for game birds, songbirds, small furbearers, and deer. Seed-producing grasses, forbs, shrubs, and nut-bearing trees provide ample food and shelter for most kinds of wildlife. Whitetail deer, bobwhite quail, mourning dove, and songbirds feed in the many open pastures and fields. They benefit from the security of the surrounding woodland cover.

The capability subclass is 4e. The woodland ordination symbol is 8F.

KsC—Kirvin soils, graded, 2 to 8 percent slopes. These gently sloping to strongly sloping soils are on oval ridges. Slopes average about 3 to 4 percent. The surface layer and the upper part of the subsoil have been removed and used as a source of gravel during construction (fig. 8). Individual areas range from 10 to 100 acres in size and average about 25 acres.

The typical sequence, depth, and composition of the layers of these soils are as follows—

Surface layer:
- 0 to 3 inches, very strongly acid, red gravelly fine sandy loam

Subsoil:
- 3 to 10 inches, very strongly acid, red sandy clay that has few yellowish mottles
- 10 to 28 inches, very strongly acid, red sandy clay loam that has few brownish and common yellowish mottles
- 28 to 40 inches, very strongly acid, mottled brownish, grayish, and reddish sandy clay loam

Substratum:
- 40 to 60 inches, very strongly acid, dark red, weakly consolidated sandy clay loam that has brownish, grayish, and yellowish mottles

Important soil properties—

Available water capacity: moderate
Permeability: moderately slow
Drainage: well drained
Runoff: medium or rapid
Water table: at a depth of more than 6 feet
Shrink-swell potential: moderate
Hazard of water erosion: severe (K factor—.20; T factor—a maximum allowance of 4 tons per acre per year)
Prime farmland: no (because of the available water capacity, a low pH, and the hazard of water erosion)

Included with these soils in mapping are areas of Bowie, Cuthbert, and Darbonne soils. Bowie and Darbonne soils have a loamy subsoil. Bowie soils are on the lower side slopes. Darbonne soils are in landscape positions similar to those of the Kirvin soils. Cuthbert soils are on the lower steep side slopes. Also included are areas where slopes are more than 8 percent, areas where the subsoil has been removed down to the parent material, areas of Kirvin soils from which the surface layer has not been removed, and some areas that have ironstone and sandstone boulders, which are remnants of mining activities. The surface layer varies in texture, depending on mining activities. In some areas it has no gravel. It is fine sandy loam to clay or the gravelly or very gravelly analogs of the textures within that range.

The contrasting Bowie soils make up less than 5

Figure 8.—An area of Kirvin soils, graded, 2 to 8 percent slopes. The gravelly topsoil and the upper part of the subsoil have been removed.

percent of the map unit. The other included soils are similar to the Kirvin soils and make up less than 15 percent of the map unit.

Most areas of the Kirvin soils are idle. A few areas are used as improved pasture or are planted to pine. In some areas establishing a plant cover is difficult because rills and gullies form soon after mining activities.

The wooded areas support hardwoods and pine. The commercial trees used for timber production are loblolly pine and shortleaf pine. Yields of loblolly pine are 130 board feet per acre per year over a 50-year period. Based on a 50-year site curve, the mean site index is 70 for loblolly pine and 57 for shortleaf pine.

Reforestation in a few areas of loblolly pine and shortleaf pine occurs naturally where seed trees are in the stand. Reforestation also can be achieved by planting loblolly pine or shortleaf pine seedlings. Selective thinning, removal of undesirable trees, and protection from wildfire increase yields. In most areas the harvested trees are of low quality and are used for pulpwood paper.

Some limitations affect timber production. The content of gravel reduces the available water capacity and thus also reduces timber production. A high seedling mortality rate and droughtiness are the major limitations. Using standard equipment that has wheels or tracks causes rutting and compaction when the soils

are moist and displacement of the surface layer when the soils are dry. Because of the clayey subsoil, puddling can occur during wet periods, making unsurfaced roads and skid trails slick and almost impassable.

These soils are subject to excessive erosion unless they are protected. Using low-pressure ground equipment minimizes soil damage and erosion and helps to maintain productivity. The proper design and careful construction of haul roads and care in the selection of sites for culverts and turnouts help to control erosion. Skid trails, firebreaks, and other areas where the surface is disturbed are subject to rilling and gullying. Revegetating the spoil from excavations reduces the hazard of rill and gully erosion.

These soils are suited to pasture grasses for grazing. Suitable pasture grasses include bahiagrass, bermudagrass, and weeping lovegrass. Low inherent soil fertility is a limitation. The soils are seasonally droughty, and the relationship between plant growth and soil moisture is poor. Applications of fertilizer and lime help to establish and maintain the stand of grasses and control erosion. Cool-season legumes, such as arrowleaf clover, crimson clover, white clover, singletary peas, and hairy vetch, provide winter forage and add nitrogen to the soils.

These soils are not suitable for cropping. The severe hazard of erosion is the main management concern.

Urban uses can be affected by several soil factors. Because of the moderate shrink-swell potential in the subsoil, building foundations can crack. The moderately slow permeability in the subsoil keeps septic tank absorption fields from operating satisfactorily. Low strength is a problem on sites for local roads and streets. Coating pipe and treating concrete minimize corrosion. Lawns are affected by the gravel in the surface layer. The limitations affecting pond reservoir areas are slight. Proper design and careful installation of structures can help to overcome or modify any hazards or limitations.

The suitability of these soils for most recreational uses is limited by the restricted permeability in the subsoil and the content of gravel in the surface layer. Areas where the native vegetation has been reestablished provide fair habitat for many animals.

The capability subclass is 6e. The woodland ordination symbol is 6C.

LaA—Latch-Mollville complex, 0 to 1 percent slopes. These nearly level soils are on stream terraces. Individual areas are irregular in shape. They range from 50 to 2,000 acres in size and average 200 acres.

This unit occurs as a series of convex, linear mounds and concave, linear flats. The Latch soil is on oblong mounds that are 2 to 4 feet higher than the adjacent Mollville soil, which is on the flats. The ridges are 200 to 1,000 feet long and 40 to 150 feet wide. The flats are 20 to 100 feet wide.

This complex is about 60 percent Latch soil, 30 percent Mollville soil, and 10 percent other soils. Individual areas range from 40 to 80 percent Latch soil, from 20 to 50 percent Mollville soil, and from 0 to 35 percent other soils. The Latch and Mollville soils occur as areas so intricately mixed that mapping them separately is not practical at the scale selected for mapping.

The typical sequence, depth, and composition of the layers of the Latch soil are as follows—

Surface layer:
0 to 7 inches, strongly acid, dark brown loamy fine sand

Subsurface layer:
7 to 55 inches, strongly acid, yellowish brown loamy fine sand

Subsoil:
55 to 72 inches, strongly acid, yellowish brown loamy fine sand
72 to 80 inches, very strongly acid, brownish yellow loamy fine sand that has common strong brown mottles

Substratum:
80 to 90 inches, strongly acid, brownish yellow fine sand that has common yellowish brown mottles

Important properties of the Latch soil—

Available water capacity: low
Permeability: moderate
Drainage: moderately well drained
Runoff: slow
Water table: perched at a depth of 2.5 to 4.0 feet during some periods in winter and spring
Root zone: very deep
Shrink-swell potential: low
Hazard of water erosion: slight (K factor—.17; T factor—a maximum allowance of 5 tons per acre per year)
Prime farmland: no (because of the available water capacity)

The typical sequence, depth, and composition of the layers of the Mollville soil are as follows—

Surface layer:
0 to 3 inches, very strongly acid, dark grayish brown loam

Subsurface layer:
3 to 8 inches, very strongly acid, grayish brown loam that has few brownish mottles

Subsoil:
8 to 20 inches, very strongly acid, grayish brown loam that has few brownish and yellowish mottles
20 to 36 inches, very strongly acid, light brownish gray clay loam that has common brownish mottles
36 to 48 inches, very strongly acid, light brownish gray loam that has common brownish mottles

Substratum:
48 to 62 inches, very strongly acid, light brownish gray loamy fine sand that has few brownish mottles

Important properties of the Mollville soil—

Available water capacity: moderate
Permeability: slow
Drainage: poorly drained
Runoff: very slow
Water table: perched within a depth of 1.0 foot during part of the year; as much as 0.5 foot above the surface during winter and spring
Root zone: very deep
Shrink-swell potential: moderate
Hazard of water erosion: slight (K factor—.37; T factor—a maximum allowance of 5 tons per acre per year)
Prime farmland: no (because of the wetness)

Included with these soils in mapping are large areas of Bienville soils and small areas of Bernaldo, Bibb, Bonn, Cart, luka, Metcalf, and Socagee soils. Bienville, Bonn, and Guyton soils are in landscape positions similar to those of the Latch and Mollville soils. Bienville soils have a sandy subsoil, Bonn soils have an accumulation of sodium, and Guyton soils have a silty subsoil. Bernaldo soils have a loamy subsoil near the surface. They are in landscape positions similar to those of the Latch and Mollville soils or are in the slightly higher positions. Bibb, luka, and Socagee soils are on flood plains. Cart soils have a fragipan. They generally are on oval mounds. Metcalf soils are clayey in the lower part of the subsoil. Also included are some low areas where the Mollville soil may be flooded during periods of high-intensity rainfall and areas where the surface layer is silt loam or fine sandy loam.

The contrasting Bernaldo, Bibb, Bonn, Cart, luka, and Metcalf soils make up less than 10 percent of the map unit. The other included soils are similar to the Latch and Mollville soils and make up less than 15 percent of the map unit.

Areas of the Latch and Mollville soils are used mainly as pasture or woodland.

The wooded areas support hardwoods and pine. The main commercial species used for timber production is loblolly pine. Yields of loblolly pine are 380 board feet per acre per year over a 50-year period on the Latch soil and 250 board feet per acre per year over a 50-year period on the Mollville soil. Based on a 50-year site curve, the mean site index for loblolly pine is 95 on the Latch soil and 82 on the Mollville soil.

Reforestation in cutover areas of loblolly pine and shortleaf pine occurs naturally where seed trees are in the stand. Reforestation also can be achieved by planting loblolly pine seedlings. Water oak and willow oak dominate the overstory on the Mollville soil unless management favors pine. When openings are made in the canopy, invading brush and hardwood species that are not controlled can delay the establishment or regeneration of pine. Selective thinning, removal of undesirable trees, and protection from wildfire increase yields.

A few limitations affect timber production. The soils have a seasonal high water table. Seedling mortality may be significant. Root development may be restricted in the Mollville soil. Trees are occasionally subject to windthrow during periods when the soils are wet. The use of equipment may be restricted to midsummer, when the soils are dry. Few limitations affect timber production on the mounded Latch soil if the trees are harvested during dry periods, when equipment can be used more easily on the Mollville soil.

Using standard equipment that has wheels or tracks causes rutting and compaction when the soils are moist and displacement of the surface layer when the soils are dry. Puddling can occur during wet periods, making unsurfaced roads and skid trails slick and impassable. Using low-pressure ground equipment minimizes soil damage and erosion and helps to maintain productivity. The proper design and careful construction of haul roads and care in the selection of sites for culverts and turnouts help to control erosion. Skid trails, firebreaks, and other areas where the surface is disturbed are subject to rilling and gullying. Revegetating the spoil from excavations reduces the hazard of rill and gully erosion.

The most commonly grown improved grasses include bahiagrass, common bermudagrass, coastal bermudagrass, and tall fescue. Poor drainage, ponding, and slow permeability are limitations in areas of the Mollville soil. Low inherent soil fertility also is a limitation. Seedbeds cannot be easily prepared or kept in good tilth. Wetness limits the use of some kinds of equipment. The soils can be worked only within a narrow range in moisture content. Applications of

fertilizer and lime, controlled grazing, and a surface drainage system improve yields and help to control erosion. Cool-season legumes, such as white clover and singletary peas, provide winter forage and add nitrogen to the soil.

Suitable pasture grasses include bahiagrass, bermudagrass, Dallisgrass, and tall fescue. Inherent fertility is moderate in the Latch soil and low in the Mollville soil. The Latch soil is wet during the cool season. The wetness can limit the use of equipment and grazing. Applications of fertilizer and lime and controlled grazing improve yields and help to control erosion. Cool-season legumes, such as white clover and singletary peas on the Latch soil and arrowleaf clover, white clover, singletary peas, and hairy vetch on the Mollville soil, provide winter forage and add nitrogen to the soils.

If used as cropland, these soils cannot be easily worked. The surface layer is wet for long periods in winter and spring. The wetness can delay planting and harvesting. The numerous mounds restrict the workability of the soils. A drainage system can increase yields.

These soils are suitable for only a limited number of crops. Because of the perched water table in spring, the soils may not be able to support the weight of a tractor. The numerous mounds interfere with tillage. Land grading and smoothing can improve surface drainage and reduce the height of the mounds, but in places a large amount of soil must be moved. The Latch soil is suited to a limited number of horticultural crops. The Mollville soil is severely limited as a site for these crops. Crop residue management is needed to maintain the content of organic matter and improve tilth. Applications of lime and fertilizer and a surface drainage system improve yields.

Urban uses can be affected by several soil factors. The high water table is a limitation on sites for buildings. The high water table and the moderately slow permeability in the subsoil keep septic tank absorption fields from operating satisfactorily. Low strength is a problem on sites for local roads and streets. Coating pipe and treating concrete minimize corrosion. Lawns are affected by droughtiness in summer. Seepage can occur in pond reservoir areas. Proper design and careful installation of structures can help to overcome or modify any hazards or limitations.

The suitability of these soils for most recreational uses is limited by the sandy surface layer, the wetness, and the restricted permeability in the subsoil. The native vegetation provides good habitat for game birds, songbirds, small furbearers, and deer. Seed-producing grasses, forbs, shrubs, and nut-bearing trees provide ample food and shelter for most kinds of wildlife. Whitetail deer, bobwhite quail, mourning dove, and songbirds feed in the many open pastures and fields. They benefit from the security of the surrounding woodland cover.

The Latch soil is in capability subclass 3s and is assigned the woodland ordination symbol 10W. The Mollville soil is in capability subclass 4w and is assigned the woodland ordination symbol 8W.

LeB—Latex fine sandy loam, 1 to 3 percent slopes. This gently sloping soil is on upland ridges and broad interstream divides. The surface is plane or weakly convex. Individual areas range from 20 to 500 acres in size and average about 125 acres.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
- 0 to 3 inches, very strongly acid, dark brown fine sandy loam

Subsurface layer:
- 3 to 10 inches, strongly acid, brown fine sandy loam

Subsoil:
- 10 to 18 inches, strongly acid, strong brown clay loam that has yellowish red mottles
- 18 to 33 inches, very strongly acid, yellowish brown clay loam that has yellowish red mottles
- 33 to 42 inches, very strongly acid, yellowish brown clay loam that has yellowish brown and red mottles and has 8 percent lenses and interfingers of very fine sand and silt
- 42 to 46 inches, very strongly acid, red clay loam that has light brownish gray and brownish yellow mottles and has 7 percent lenses and interfingers of very fine sand and silt
- 46 to 75 inches, very strongly acid, red clay that has brownish yellow and light brownish gray mottles and has 3 percent lenses of very fine sand and silt
- 75 to 80 inches, very strongly acid, mottled light gray and red, weakly stratified siltstone and very fine sandy loam having yellowish red mottles

Important soil properties—

Available water capacity: high
Permeability: slow
Drainage: well drained
Runoff: slow
Water table: at a depth of 3.0 to 4.5 feet during winter and spring and below a depth of 6.0 feet during the rest of the year
Root zone: very deep

Shrink-swell potential: moderate in the upper part of the subsoil and high in the lower part
Hazard of water erosion: moderate (K factor—.37; T factor—a maximum allowance of 5 tons per acre per year)
Prime farmland: yes (all the soil properties meet the criteria)

Included with this soil in mapping are small areas of Bernaldo, Eastwood, Elrose, Meth, Scottsville, and Wolfpen soils. Bernaldo soils are loamy throughout the subsoil. They are in the slightly higher gently sloping areas. Eastwood soils have a clayey subsoil. They are on the higher convex ridgetops and the lower gently sloping to moderately steep side slopes. Elrose soils have a red subsoil. They are in gently sloping areas on the higher convex ridgetops. Meth soils have a red, clayey subsoil. They are on the higher convex ridgetops. Scottsville soils have a clayey subsoil layer 20 to 40 inches below the surface. They are in the slightly lower nearly level to gently sloping areas. Wolfpen soils have a sandy surface layer that is 20 to 40 inches thick and are loamy throughout the subsoil. They are in gently sloping, convex areas on the higher parts of the landscape or are on the higher moderately sloping to moderately steep side slopes. Also included are soils that are similar to the Latex soil but have a surface layer of very fine sandy loam.

The contrasting Eastwood and Meth soils make up less than 5 percent of the map unit. The other included soils are similar to the Latex soil and make up less than 20 percent of the map unit.

Areas of the Latex soil are used mainly as woodland or pasture. A few areas are used for nonirrigated crops or for homesite development.

The wooded areas support hardwoods and pine. The commercial trees used for timber production are loblolly pine, slash pine, and shortleaf pine. Yields of loblolly pine are 390 board feet per acre per year over a 50-year period. Based on a 50-year site curve, the mean site index is 96 for loblolly pine and 86 for shortleaf pine.

Reforestation in cutover areas of loblolly pine and shortleaf pine occurs naturally where seed trees are in the stand. Reforestation also can be achieved by planting loblolly pine seedlings. When openings are made in the canopy, invading brush and hardwood species that are not controlled can delay the establishment or regeneration of pine. Selective thinning, removal of undesirable trees, and protection from wildfire increase yields.

No major problems affect timber production. Using standard equipment that has wheels or tracks causes rutting and compaction when the soil is moist and displacement of the surface layer when the soil is dry. Puddling can occur during wet periods, making unsurfaced roads and skid trails slick and almost impassable.

Using low-pressure ground equipment minimizes soil damage and erosion and helps to maintain productivity. The proper design and careful construction of haul roads and care in the selection of sites for culverts and turnouts help to control erosion. Skid trails, firebreaks, and other areas where the surface is disturbed are subject to rilling and gullying. Revegetating the spoil from excavations reduces the hazard of rill and gully erosion.

This soil is well suited to pasture grasses for grazing or hay. No major limitations affect these uses. Suitable pasture grasses include bahiagrass, bermudagrass, Dallisgrass, tall fescue, and weeping lovegrass. Low inherent soil fertility is a limitation. The relationship between plant growth and soil moisture is good. Applications of fertilizer and lime and controlled grazing improve yields and help to control erosion. Cool-season legumes, such as arrowleaf clover, white clover, singletary peas, and hairy vetch, provide winter forage and add nitrogen to the soil.

This soil is suitable for corn, grain sorghum, and truck crops, such as peas. Where the plant cover is inadequate, erosion is a hazard. Conservation tillage, terraces, and contour farming help to prevent excessive erosion. Crop growth may be limited by an insufficient amount of water during dry periods in summer. The soil is suited to several kinds of horticultural crops. Crop residue management is needed to maintain the content of organic matter, improve tilth, and control erosion. The soil can be tilled throughout a wide range in moisture content. Applications of lime and fertilizer improve yields.

Urban uses can be affected by several soil factors. Because of the moderate shrink-swell potential in the subsoil, building foundations can crack. The slow permeability in the subsoil keeps septic tank absorption fields from operating satisfactorily. Low strength is a problem on sites for local roads and streets. Coating pipe and treating concrete minimize corrosion. Seepage may be a problem in pond reservoir areas. The limitations affecting lawns are slight. Proper design and careful installation of structures can help to overcome or modify any hazards or limitations.

The suitability of this soil for most recreational uses is limited by the texture of the surface layer. The native vegetation provides good habitat for game birds, songbirds, small furbearers, and deer. Seed-producing grasses, forbs, shrubs, and nut-bearing trees provide ample food and shelter for most kinds of wildlife. Whitetail deer, bobwhite quail, mourning dove, and

songbirds feed in the many open pastures and fields. They benefit from the security of the surrounding woodland cover.

The capability subclass is 2e. The woodland ordination symbol is 10A.

LtC—Lilbert loamy fine sand, 2 to 5 percent slopes. This gently sloping soil is on upland ridges and broad interstream divides. The surface is plane or weakly convex. Individual areas range from 15 to 500 acres in size and average about 125 acres.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 9 inches, strongly acid, dark brown loamy fine sand

Subsurface layer:

9 to 14 inches, strongly acid, brown loamy fine sand

14 to 23 inches, strongly acid, light yellowish brown loamy fine sand

Subsoil:

23 to 43 inches, medium acid, yellowish brown sandy clay loam that has yellowish red mottles

43 to 77 inches, very strongly acid, yellowish brown sandy clay loam that has yellowish red and strong brown mottles and has common plinthite nodules

77 to 80 inches, very strongly acid, dark yellowish brown sandy clay loam that has red and light brownish gray mottles

Important soil properties—

Available water capacity: moderate
Permeability: moderately slow
Drainage: well drained
Runoff: slow
Water table: perched at a depth of 3 to 6 feet during winter and early spring in most years
Root zone: very deep
Shrink-swell potential: low
Hazard of water erosion: slight (K factor—.20; T factor—a maximum allowance of 5 tons per acre per year)
Prime farmland: no (because of the available water capacity)

Included with this soil in mapping are small areas of Bibb, Bowie, Cuthbert, Darco, Darden, Iuka, Kirvin, and Warnock soils. Bibb and Iuka soils are loamy. They are along narrow creeks. Bowie soils have a surface layer that is less than 20 inches thick. They are in landscape positions similar to those of the Lilbert soil or are in the slightly lower positions. Cuthbert soils have a clayey subsoil. They are in the lower or higher areas on sloping to moderately steep side slopes. Darco soils have a surface layer that is 40 to 78 inches thick. They are in landscape positions similar to those of the Lilbert soil or are on strongly sloping and moderately steep side slopes. Darden soils are sandy throughout. They are in landscape positions similar to those of the Lilbert soil. Kirvin soils have a clayey subsoil. They are in the lower or higher gently sloping areas. Warnock soils have a surface layer that is as much as 20 inches thick. They are on side slopes. Also included are areas of soils that are well drained, have a red subsoil, and are on small ridges and a few small areas of soils that have slopes of more than 5 percent.

The contrasting Bibb, Cuthbert, Darden, Iuka, and Kirvin soils make up less than 5 percent of the map unit. The other included soils are similar to the Lilbert soil and make up less than 20 percent of the map unit.

Areas of the Lilbert soil are used mainly as woodland. A few areas are used as pasture.

The wooded areas support hardwoods and pine. The commercial trees used for timber production are loblolly pine, slash pine, and shortleaf pine. Yields of loblolly pine are 280 board feet per acre per year over a 50-year period. Based on a 50-year site curve, the mean site index is 85 for loblolly pine and 74 for shortleaf pine.

Reforestation in cutover areas of loblolly pine and shortleaf pine occurs naturally where seed trees are in the stand. Reforestation also can be achieved by planting loblolly pine seedlings. When openings are made in the canopy, invading brush and hardwood species that are not controlled can delay the establishment or regeneration of pine. Selective thinning, removal of undesirable trees, and protection from wildfire increase yields.

A few limitations affect timber production. Seedling mortality may be significant because of droughtiness in this sandy soil. Larger or containerized nursery stock may be needed rather than the usual bare root stock. The loose, sandy surface layer hinders the use of wheeled equipment, especially when the soil is very dry. Using standard equipment that has wheels or tracks causes rutting and compaction when the soil is moist and displacement of the surface layer when the soil is dry.

Using low-pressure ground equipment minimizes soil damage and erosion and helps to maintain productivity. The proper design and careful construction of haul roads and care in the selection of sites for culverts and turnouts help to control erosion. Skid trails, firebreaks, and other areas where the surface is disturbed are subject to rilling and gullying. Revegetating the spoil from excavations reduces the hazard of rill and gully erosion.

Suitable pasture grasses include bahiagrass, bermudagrass, and weeping lovegrass. Low inherent soil fertility is a limitation. Although only low or moderate amounts of soil moisture are held in the profile, much of the moisture is readily available to plants. Obtaining a firm seedbed is difficult. Emerging grass seedlings can be killed by windblown sand unless cultural practices are applied. Applications of fertilizer and lime and controlled grazing improve yields and help to control erosion. Cool-season legumes, such as arrowleaf clover, crimson clover, and hairy vetch, provide winter forage and add nitrogen to the soil.

This soil is suitable for peas, corn, and watermelons. Where the plant cover is inadequate or the slope exceeds 3 percent, erosion is a hazard. Conservation tillage, terraces, and contour farming help to prevent excessive erosion. Crop growth may be limited by a lack of water during dry periods because of the low available water capacity in the upper part of the soil. The soil is suited to several kinds of horticultural crops. Crop residue management is needed to maintain the content of organic matter and improve tilth. The soil can be tilled throughout a wide range in moisture content. Applications of lime and fertilizer improve yields.

Urban uses may be affected by several soil factors. The rapid permeability in the topsoil keeps septic tank absorption fields from operating satisfactorily. Coating pipe and treating concrete minimize corrosion. Wetness is a limitation on sites for dwellings with basements. Droughtiness may be a limitation on sites for lawns. Seepage may be a problem in pond reservoir areas. The limitations that affect buildings and local roads and streets generally are slight. Proper design and careful installation of structures can help to overcome or modify any hazards or limitations.

The suitability of this soil for most recreational uses is limited by the sandy surface layer. The native vegetation provides good habitat for game birds, songbirds, small furbearers, and deer. Seed-producing grasses, forbs, shrubs, and nut-bearing trees provide ample food and shelter for most kinds of wildlife. Whitetail deer, bobwhite quail, mourning dove, and songbirds feed in the many open pastures and fields. They benefit from the security of the surrounding woodland cover.

The capability subclass is 3e. The woodland ordination symbol is 8S.

MaG—Maben very fine sandy loam, 20 to 40 percent slopes. This steep soil is on side slopes in the uplands. It is mainly in and adjacent to Caddo Lake State Park. The landscape is dissected and slightly convex. The soil occurs as one area 477 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 3 inches, very strongly acid, dark brown very fine sandy loam that has few yellowish red mottles

Subsoil:

3 to 6 inches, extremely acid, red clay

6 to 18 inches, extremely acid, red clay loam that has few yellowish mottles

18 to 24 inches, extremely acid, yellowish red sandy clay that has common yellowish mottles

24 to 32 inches, extremely acid, mottled yellowish red and pale brown silt loam that has common reddish and grayish mottles

Substratum:

32 to 60 inches, very strongly acid, mottled reddish, grayish, and brownish shaly silt loam

Important soil properties—

Available water capacity: moderate
Permeability: moderately slow
Drainage: well drained
Runoff: rapid
Water table: at a depth of more than 6 feet throughout the year
Root zone: moderately deep over weakly consolidated siltstone
Shrink-swell potential: high
Hazard of water erosion: severe (K factor—.37; T factor—a maximum allowance of 3 tons per acre per year)
Prime farmland: no (because of the slope and the hazard of water erosion)

Included with this soil in mapping are small areas of Bernaldo, Eastwood, Iuka, Meth, and Wolfpen soils. Bernaldo soils are loamy throughout. They are on the lower side slopes adjacent to drainageways. Eastwood soils have a subsoil that is thicker than that of the Maben soil. They are in areas where slopes are less than 20 percent. Iuka soils have a loamy subsoil. They are along drainageways. Meth soils do not have gray colors. They are in the higher gently sloping areas. Wolfpen soils are loamy fine sand in the upper 20 to 40 inches. They are in the higher landscape positions. Also included are areas where slopes are more than 40 percent and areas of soils that are similar to the Maben soil but have a surface layer of loam or silt loam.

The contrasting Bernaldo, Iuka, and Wolfpen soils make up less than 5 percent of the map unit. The other included soils are similar to the Maben soil and make up less than 15 percent of the map unit.

Areas of the Maben soil are used as woodland. They support hardwoods and pine. The commercial trees used for timber production are loblolly pine and shortleaf pine. Yields of loblolly pine are 210 board feet per acre per year over a 50-year period. Based on a 50-year site curve, the mean site index is 78 for loblolly pine and 69 for shortleaf pine.

Reforestation in cutover areas of loblolly pine and shortleaf pine occurs naturally where seed trees are in the stand. Reforestation also can be achieved by planting loblolly pine seedlings. When openings are made in the canopy, invading brush and hardwood species that are not controlled can delay the establishment or regeneration of pine. Selective thinning, removal of undesirable trees, and protection from wildfire increase yields.

Some problems affect timber production. Using standard equipment that has wheels or tracks causes rutting and compaction when the soil is moist and displacement of the surface layer when the soil is dry. Because of the clayey subsoil, puddling can occur during wet periods, making unsurfaced roads and skid trails slick and almost impassable. The slope can limit the use of equipment. Special equipment may be needed.

Because of the slope and the texture of the surface layer, excessive erosion can occur unless the soil is protected. Using low-pressure ground equipment minimizes soil damage and erosion and helps to maintain productivity. The proper design and careful construction of haul roads and care in the selection of sites for culverts and turnouts help to control erosion. Skid trails, firebreaks, and other areas where the surface is disturbed are subject to rilling and gullying. Revegetating the spoil from excavations reduces the hazard of rill and gully erosion.

This soil is not suitable for improved pasture or for cropping because of the slope and the susceptibility to erosion.

This soil is unsuited to urban uses, but homesites with scenic views are in some areas. The slope and the shrink-swell potential are the major limitations.

The suitability of this soil for most recreational uses is limited by the restricted permeability in the subsoil and the slope. Nature trails provide access to areas that have a wide variety of trees and shrubs. The slope and the hazard of erosion are the main management concerns. The native vegetation provides good habitat for game birds, songbirds, small furbearers, and deer. Seed-producing grasses, forbs, shrubs, and nut-bearing trees provide ample food and shelter for most kinds of wildlife.

The capability subclass is 7e. The woodland ordination symbol is 8R.

MbB—Marklake fine sandy loam, 1 to 3 percent slopes. This very gently sloping soil is in reclaimed areas that formerly were strip-mined. It is on terraces and uplands. The surface is plane or weakly convex. The soil occurs as one area 550 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 6 inches, strongly acid, dark brown fine sandy loam that has yellowish brown and pale brown mottles and has few lignite fragments and few shale fragments

Substratum:

6 to 17 inches, very strongly acid, yellowish brown sandy clay loam that has brownish yellow and light brownish gray mottles and has few lignite fragments

17 to 24 inches, strongly acid, dark grayish brown fine sandy loam that has brownish yellow and dark brown mottles and has common lignite fragments

24 to 40 inches, very strongly acid, mottled yellowish brown, brown, and brownish yellow fine sandy loam that has reddish yellow mottles and has many lignite fragments

40 to 60 inches, strongly acid, light brownish gray clay loam that has strong brown and yellow mottles and has common shale fragments

Important soil properties—

Available water capacity: high
Permeability: slow
Drainage: well drained
Runoff: medium
Water table: at a depth of more than 6 feet throughout the year
Root zone: very deep
Shrink-swell potential: moderate
Hazard of water erosion: moderate (K factor—.37; T factor—a maximum allowance of 5 tons per acre per year)
Prime farmland: no (because the sustained production potential has not been determined)

Included with this soil in mapping are small areas of Bernaldo, Bibb, Bowie, Cart, Eastwood, Elrose, Erno, Guyton, and Iuka soils. All of these included soils have developed horizons and have not been disturbed by mining activities. They are contrasting soils and make up less than 5 percent of the map unit. Bernaldo, Bowie, Cart, Eastwood, Elrose, Erno, and Guyton soils are in landscape positions similar to those of the

Marklake soil. Bibb and luka soils are on bottom land and are subject to flooding. Also included are areas of soils that have a coarse-loamy or clayey subsoil and areas of soils that are similar to the Marklake soil but have a surface layer of sandy clay loam. The soils that have a coarse-loamy subsoil make up about 15 percent of the map unit, and the ones that have a clayey subsoil make up about 5 percent.

Areas of the Marklake soil are used mainly as pasture or woodland.

The wooded areas support pine. The main commercial species used for timber production is loblolly pine. Estimated yields of loblolly pine are 180 board feet per acre per year over a 50-year period. The estimated mean site index for loblolly pine is 75.

Most areas have been reforested with planted loblolly pine. Selective thinning, removal of undesirable trees, and protection from wildfire increase yields.

No major problems affect timber production. Using standard equipment that has wheels or tracks causes rutting and compaction when the soil is moist and displacement of the surface layer when the soil is dry. Puddling can occur during wet periods, making unsurfaced roads and skid trails slick and almost impassable.

Using low-pressure ground equipment minimizes soil damage and erosion and helps to maintain productivity. The proper design and careful construction of haul roads and care in the selection of sites for culverts and turnouts help to control erosion. Skid trails, firebreaks, and other areas where the surface is disturbed are subject to rilling and gullying. Revegetating the spoil from excavations reduces the hazard of rill and gully erosion.

Suitable pasture grasses include bahiagrass, bermudagrass, and weeping lovegrass. Low inherent soil fertility is a limitation. Applications of fertilizer and lime and controlled grazing improve yields and help to control erosion. Cool-season legumes, such as arrowleaf clover, white clover, singletary peas, and hairy vetch, provide winter forage and add nitrogen to the soil.

This soil is suitable for some crops. Where the plant cover is not adequate, erosion is a hazard. Conservation tillage, terraces, and contour farming help to prevent excessive erosion. Crop growth may be limited by a lack of water during dry periods in summer The soil is suited to some horticultural crops. Crop residue management is needed to maintain the content of organic matter and improve tilth. Applications of lime and fertilizer improve yields.

Urban uses can be affected by several soil factors. Because of the moderate shrink-swell potential and the possibility of unstable fill, building foundations can crack. The slow permeability keeps septic tank absorption fields from operating properly. Low strength, the moderate shrink-swell potential, and the possibility of unstable fill are problems on sites for local roads and streets. Coating pipe and treating concrete minimize corrosion. The limitations affecting lawns are slight. Proper design and careful installation of structures can help to overcome or modify any hazards or limitations.

The suitability of this soil for most recreational uses is limited by the restricted permeability. The kinds of native plants and the number of game birds, songbirds, small furbearers, and deer are limited.

The capability subclass is 3e. The woodland ordination symbol is 7A.

MbC—Marklake fine sandy loam, 3 to 5 percent slopes. This gently sloping soil is in reclaimed areas that formerly were strip-mined. It is on terraces and uplands. The surface is plane or weakly convex. The soil occurs as one area 354 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 8 inches, very strongly acid, dark brown fine sandy loam that has common fragments of yellowish brown fine sandy loam and has common lignite fragments

Substratum:

8 to 45 inches, very strongly acid, brown sandy clay loam that has common fragments of red, yellowish brown, and strong brown sandy clay loam, few fragments of pale brown fine sandy loam, and many lignite fragments and partings

45 to 60 inches, very strongly acid, light yellowish brown sandy clay loam that has common fragments of reddish yellow sandy clay loam and light gray fine sandy loam and common lignite fragments and partings

Important soil properties—

Available water capacity: high
Permeability: slow
Drainage: well drained
Runoff: medium
Water table: at a depth of more than 6 feet throughout the year
Root zone: very deep
Shrink-swell potential: moderate
Hazard of water erosion: moderate (K factor—.37; T factor—a maximum allowance of 5 tons per acre per year)

Prime farmland: no (because the sustained production potential has not been determined)

Included with this soil in mapping are small areas of Bernaldo, Bibb, Bowie, Cart, Eastwood, Elrose, Erno, Guyton, and Iuka soils. All of these included soils have developed horizons and have not been disturbed by mining activities. They are contrasting soils and make up less than 10 percent of the map unit. Bernaldo, Bowie, Cart, Eastwood, Elrose, Erno, and Guyton soils are in landscape positions similar to those of the Marklake soil. Bibb and Iuka soils are on bottom land and are subject to flooding. Also included are areas of soils that have a coarse-loamy or clayey subsoil and areas of soils that are similar to the Marklake soil but have a surface layer of sandy clay loam. The soils that have a coarse-loamy subsoil make up about 15 percent of the map unit, and the ones that have a clayey subsoil make up about 5 percent.

Areas of the Marklake soil are used mainly as pasture or woodland.

The wooded areas support pine. The main commercial species used for timber production is loblolly pine. Estimated yields of loblolly pine are 180 board feet per acre per year over a 50-year period. The estimated mean site index for loblolly pine is 75.

Many areas have been reforested with planted loblolly pine. Selective thinning, removal of undesirable trees, and protection from wildfire increase yields.

No major problems affect timber production. Using standard equipment that has wheels or tracks causes rutting and compaction when the soil is moist and displacement of the surface layer when the soil is dry. Puddling can occur during wet periods, making unsurfaced roads and skid trails slick and almost impassable.

Using low-pressure ground equipment minimizes soil damage and erosion and helps to maintain productivity. The proper design and careful construction of haul roads and care in the selection of sites for culverts and turnouts help to control erosion. Skid trails, firebreaks, and other areas where the surface is disturbed are subject to rilling and gullying. Revegetating the spoil from excavations reduces the hazard of rill and gully erosion.

Suitable pasture grasses include bahiagrass, bermudagrass, and weeping lovegrass. Low inherent soil fertility is a limitation. Applications of fertilizer and lime and controlled grazing improve yields and help to control erosion. Cool-season legumes, such as arrowleaf clover, white clover, singletary peas, and hairy vetch, provide winter forage and add nitrogen to the soil.

This soil is suitable for some crops. Where the plant cover is inadequate, erosion is a hazard. Conservation tillage, terraces, and contour farming help to prevent excessive erosion. Crop growth may be limited by a lack of water during dry periods in summer. The soil is suited to some horticultural crops. Crop residue management is needed to maintain the content of organic matter and improve tilth. Applications of lime and fertilizer improve yields.

Urban uses may be affected by several soil factors. Because of the moderate shrink-swell potential and the possibility of unstable fill, building foundations can crack. The slow permeability keeps septic tank absorption fields from operating properly. Low strength, the moderate shrink-swell potential, and the possibility of unstable fill are problems on sites for local roads and streets. Coating pipe and treating concrete minimize corrosion. The limitations affecting lawns are slight. Proper design and careful installation of structures can help to overcome or modify any hazards or limitations.

The suitability of this soil for most recreational uses is limited by the restricted permeability. The kinds of native plants and the number of game birds, songbirds, small furbearers, and deer are limited.

The capability subclass is 4e. The woodland ordination symbol is 7A.

MbE—Marklake sandy clay loam, 12 to 20 percent slopes. This moderately steep soil is in reclaimed areas that formerly were strip-mined. It is on terraces and uplands. The surface is plane or weakly convex. The soil occurs as one area 167 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 3 inches, very strongly acid, dark brown sandy clay loam that has common fragments of yellowish brown and reddish brown sandy clay loam and has common lignite fragments and partings

Substratum:

3 to 10 inches, very strongly acid, yellowish brown sandy clay loam that has common fragments of yellowish brown and dark brown sandy clay loam and common lignite fragments and partings

10 to 36 inches, very strongly acid, very dark grayish brown sandy clay loam that has common fragments of yellowish red, dark brown, brownish yellow, and light brownish gray sandy clay loam and many lignite fragments and partings

36 to 60 inches, very strongly acid, mottled dark brown, brownish yellow, very dark gray, dark gray, reddish brown, and red sandy clay loam that has common lignite fragments and partings

Important soil properties—

Available water capacity: high
Permeability: slow
Drainage: well drained
Runoff: medium
Water table: at a depth of more than 6 feet throughout the year
Root zone: very deep
Shrink-swell potential: moderate
Hazard of water erosion: moderate (K factor—.37; T factor—a maximum allowance of 5 tons per acre per year)
Prime farmland: no (because of the slope and the hazard of water erosion; also because the sustained production potential has not been determined)

Included with this soil in mapping are small areas of Bernaldo, Bibb, Bowie, Cart, Eastwood, Elrose, Erno, Guyton, and Iuka soils. All of these included soils have developed horizons and have not been disturbed by mining activities. They are contrasting soils and make up less than 10 percent of the map unit. Bernaldo, Bowie, Cart, Elrose, Erno, and Guyton soils are in nearly level to gently sloping areas. Bibb and Iuka soils are in nearly level areas on bottom land and are subject to flooding. Eastwood soils are on steep side slopes. Also included are areas of soils that have a coarse-loamy or clayey subsoil, areas of soils that are similar to the Marklake soil but have slopes of more than 20 percent, and areas where the surface layer is fine sandy loam. The soils that have a coarse-loamy subsoil make up about 15 percent of the map unit, and the ones that have a clayey subsoil make up about 5 percent.

Areas of the Marklake soil are used mainly as pasture or woodland.

The wooded areas support pine. The main commercial species used for timber production is loblolly pine. Estimated yields of loblolly pine are 130 board feet per acre per year over a 50-year period. The estimated mean site index for loblolly pine is 70.

Some areas have been reforested with planted loblolly pine. Selective thinning, removal of undesirable trees, and protection from wildfire increase yields.

Because of the slope, the equipment limitation and the hazard of erosion are moderate. Using standard equipment that has wheels or tracks causes rutting and compaction when the soil is moist and displacement of the surface layer when the soil is dry. Puddling can occur during wet periods, making unsurfaced roads and skid trails slick and almost impassable.

Using low-pressure ground equipment minimizes soil damage and erosion and helps to maintain productivity. The proper design and careful construction of haul roads and care in the selection of sites for culverts and turnouts help to control erosion. Skid trails, firebreaks, and other areas where the surface is disturbed are subject to rilling and gullying. Revegetating the spoil from excavations reduces the hazard of rill and gully erosion.

Suitable pasture grasses include bahiagrass, bermudagrass, and weeping lovegrass. Low inherent soil fertility is a limitation. Applications of fertilizer and lime and controlled grazing improve yields and help to control erosion. Cool-season legumes, such as arrowleaf clover, white clover, singletary peas, and hairy vetch, provide winter forage and add nitrogen to the soil.

This soil is not suitable for cropping because of the slope and the hazard of erosion.

Urban uses are severely affected by several soil factors. The slope is the major limitation. Because of the moderate shrink-swell potential and the possibility of unstable fill, building foundations can crack. The slow permeability keeps septic tank absorption fields from operating properly. Low strength, the moderate shrink-swell potential, and the possibility of unstable fill are problems on sites for local roads and streets. Coating pipe and treating concrete minimize corrosion. The limitations affecting lawns are slight. Proper design and careful installation of structures can help to overcome or modify any hazards or limitations.

The suitability of this soil for most recreational uses is limited by the slope and the restricted permeability. The kinds of native plants and the number of game birds, songbirds, small furbearers, and deer are limited.

The capability subclass is 6e. The woodland ordination symbol is 6R.

McA—Metcalf-Cart complex, 0 to 2 percent slopes. These soils are on nearly level, mounded stream terraces in areas of the Wilcox Formation. They are on slightly concave flats. Oval mounds dot the landscape. Individual areas are generally long and narrow. They range from 20 to 500 acres in size and average about 75 acres.

The Metcalf soil is in low flats that are about 25 to 1,000 feet wide and are sinuous and connected. The Cart soil typically is on oval mounds that are 4 to 6 feet high, 50 to 200 feet wide, and 50 to 250 feet apart.

This complex is about 50 percent Metcalf soil, 30 percent Cart soil, and 20 percent other soils. Individual areas range from 40 to 60 percent Metcalf soil, from 20 to 40 percent Cart soil, and from 10 to 30 percent other soils. The Metcalf and Cart soils occur as areas so intricately mixed that mapping them separately is not practical at the scale selected for mapping.

The typical sequence, depth, and composition of the layers of the Metcalf soil are as follows—

Surface layer:
0 to 3 inches, very strongly acid, grayish brown silt loam

Subsurface layer:
3 to 10 inches, very strongly acid, gray silt loam that has strong brown and brownish yellow mottles

Subsoil:
10 to 21 inches, very strongly acid, light yellowish brown silt loam that has brownish yellow and yellowish red mottles and has 10 percent tongues, interfingers, and lenses of material from the subsurface layer
21 to 29 inches, very strongly acid, light yellowish brown loam that has yellowish red and strong brown mottles and has 20 percent tongues, interfingers, and lenses of material from the subsurface layer
29 to 36 inches, very strongly acid, light brownish gray clay loam that has brownish yellow, red, and reddish yellow mottles and has 2 percent tongues, interfingers, and lenses of material from the subsurface layer
36 to 43 inches, very strongly acid, light gray clay that has light yellowish brown, brownish yellow, and yellowish red mottles and has 2 percent lenses of material from the subsurface layer
43 to 57 inches, very strongly acid, light gray clay that has very pale brown, brownish yellow, and reddish yellow mottles and has 2 percent lenses of material from the subsurface layer
57 to 73 inches, neutral, light gray silty clay that has light yellowish brown mottles and has 1 percent lenses of material from the subsurface layer

Important properties of the Metcalf soil—

Available water capacity: high
Permeability: very slow
Drainage: somewhat poorly drained
Runoff: medium
Water table: at a depth of 1.5 to 2.5 feet during winter and spring and below a depth of 6.0 feet during the rest of the year
Root zone: very deep
Shrink-swell potential: low in the upper part of the subsoil and high in the lower part
Hazard of water erosion: slight (K factor—.49; T factor—a maximum allowance of 5 tons per acre per year)
Prime farmland: yes (all the soil properties meet the criteria)

The typical sequence, depth, and composition of the layers of the Cart soil are as follows—

Surface layer:
0 to 4 inches, very strongly acid, yellowish brown very fine sandy loam

Subsurface layer:
4 to 28 inches, very strongly acid, light yellowish brown very fine sandy loam

Subsoil:
28 to 40 inches, very strongly acid, strong brown loam that has 10 percent lenses and interfingers of material from the subsurface layer
40 to 50 inches, very strongly acid, strong brown loam that has 10 percent lenses and interfingers of material from the subsurface layer and has 10 percent brittle bodies
50 to 56 inches, very strongly acid, mottled reddish yellow and brownish yellow loam that has about 15 percent lenses and interfingers of material from the subsurface layer and has 40 to 60 percent brittle bodies
56 to 77 inches, very strongly acid, brownish yellow loam that has strong brown and yellowish red mottles, has 30 percent lenses and tongues of material from the subsurface layer, and has 65 to 70 percent brittle bodies
77 to 80 inches, very strongly acid, mottled yellowish brown and light yellowish brown fine sandy loam that has brownish yellow mottles, has 10 percent lenses of material from the subsurface layer, and has 5 percent brittle bodies

Important properties of the Cart soil—

Available water capacity: moderate
Permeability: slow
Drainage: well drained
Runoff: slow
Water table: at a depth of 3 to 4 feet during winter and spring and below a depth of 6 feet during the rest of the year
Root zone: very deep
Shrink-swell potential: low
Hazard of water erosion: slight (K factor—.55; T factor—a maximum allowance of 5 tons per acre per year)
Prime farmland: yes (all the soil properties meet the criteria)

Included with these soils in mapping are small areas of Bonn, Eastwood, Guyton, Iuka, Latex, Sardis, and Scottsville soils. Bonn soils have high concentrations of sodium salts in the subsoil. They are on the slightly lower terraces. Eastwood soils have a clayey subsoil. They are on the higher gently sloping ridgetops and the

lower moderately sloping to moderately steep side slopes. Guyton soils are gray throughout and have a silty subsoil. They are in landscape positions similar to those of the Metcalf and Cart soils. Iuka and Sardis soils are on bottom land and are subject to flooding. Iuka soils are stratified throughout, and Sardis soils are silty throughout. Latex and Scottsville soils are loamy in the upper part of the subsoil and clayey in the lower part of the subsoil. They are in the slightly higher landscape positions. Also included are some mounded soils that have a clayey subsoil below a depth of 50 inches and some areas where the surface layer is loam, silt loam, or very fine sandy loam.

The contrasting Bonn, Eastwood, Guyton, Iuka, and Sardis soils make up less than 5 percent of the map unit. The other included soils are similar to the Metcalf and Cart soils and make up less than 20 percent of the map unit.

Areas of the Metcalf and Cart soils are used mainly as woodland. A few areas are used as pasture.

The wooded areas support hardwoods and pine. The main commercial species used for timber production is loblolly pine. Yields of loblolly pine are 350 board feet per acre per year over a 50-year period on the Metcalf soil and 462 board feet per acre per year over a 50-year period on the Cart soil. Based on a 50-year site curve, the mean site index for loblolly pine is 92 on the Metcalf soil. On the Cart soil, the mean site index is 102 for loblolly pine and slash pine and 87 for shortleaf pine.

Reforestation in cutover areas of loblolly pine and shortleaf pine occurs naturally where seed trees are in the stand. Reforestation also can be achieved by planting loblolly pine seedlings. When openings are made in the canopy, invading brush and hardwood species that are not controlled can delay the establishment or regeneration of pine. Selective thinning, removal of undesirable trees, and protection from wildfire increase yields.

A few problems affect timber production. The Metcalf soil has a seasonal high water table. Seedling mortality may be significant. Root development may be restricted. Trees are occasionally subject to windthrow during periods when the soils are wet. The use of equipment may be restricted to midsummer, when the soils are dry. Few limitations affect timber production on the mounded Cart soil if the trees are harvested during dry periods, when equipment can be used more easily on the Metcalf soil.

Using standard equipment that has wheels or tracks causes rutting and compaction when the soil is moist and displacement of the surface layer when the soil is dry. Puddling can occur during wet periods, making unsurfaced roads and skid trails slick and impassable. Using low-pressure ground equipment minimizes soil damage and erosion and helps to maintain productivity. The proper design and careful construction of haul roads and care in the selection of sites for culverts and turnouts help to control erosion. Skid trails, firebreaks, and other areas where the surface is disturbed are subject to rilling and gullying. Revegetating the spoil from excavations reduces the hazard of rill and gully erosion.

Suitable pasture grasses include bahiagrass, bermudagrass, Dallisgrass, and tall fescue. Inherent fertility is moderate in the Metcalf soil and low in the Cart soil. The Metcalf soil is wet during the cool season. The wetness can limit the use of equipment and grazing. Applications of fertilizer and lime and controlled grazing improve yields and help to control erosion. Cool-season legumes, such as white clover and singletary peas on the Metcalf soil and arrowleaf clover, white clover, singletary peas, and hairy vetch on the Cart soil, provide winter forage and add nitrogen to the soils.

Suitable crops include peas, corn, and grain sorghum. Because of the perched water table in spring, the soils may not be able to support the weight of a tractor. The wetness can delay planting and harvesting. The numerous mounds interfere with tillage. Land grading and smoothing can improve surface drainage and reduce the height of the mounds, but in places a large amount of soil must be moved. The Metcalf soil is suited to a limited number of horticultural crops. The Cart soil is suited to several kinds of horticultural crops, but the mounds occur as small areas that cannot be managed easily. Crop residue management is needed to maintain the content of organic matter and improve tilth. Applications of lime and fertilizer and a surface drainage system improve yields.

Urban uses can be affected by several soil factors. The high water table in the Metcalf soil is a limitation on sites for buildings. The high water table and the restricted permeability in the subsoil keep septic tank absorption fields from operating satisfactorily. Low strength is a problem on sites for local roads and streets. Coating pipe and treating concrete minimize corrosion. The limitations affecting lawns are slight. Those that affect pond reservoir areas also are slight. Proper design and careful installation of structures can help to overcome or modify any hazards or limitations.

The suitability of these soils for most recreational uses is limited by wetness and the restricted permeability in the subsoil. The native vegetation provides good habitat for game birds, songbirds, small furbearers, and deer. Seed-producing grasses, forbs, shrubs, and nut-bearing trees provide ample food and shelter for most kinds of wildlife. Whitetail deer,

bobwhite quail, mourning dove, and songbirds feed in the many open pastures and fields. They benefit from the security of the surrounding woodland cover.

The Metcalf soil is in capability subclass 2w and is assigned the woodland ordination symbol 10W. The Cart soil is in capability subclass 2e and is assigned the woodland ordination symbol 11A.

MeB—Meth fine sandy loam, 1 to 3 percent slopes. This very gently sloping soil is on ridges in the uplands. The surface is plane to convex. Individual areas range from 15 to 500 acres in size and average about 50 acres.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 6 inches, strongly acid, dark brown fine sandy loam

Subsoil:

6 to 19 inches, very strongly acid, red clay loam that has yellowish red mottles

19 to 25 inches, very strongly acid, red clay that has brownish yellow and reddish yellow mottles

25 to 37 inches, very strongly acid, red sandy clay loam that has light gray and brownish yellow mottles

37 to 50 inches, very strongly acid, mottled light gray and red clay loam that has brownish yellow mottles

50 to 59 inches, very strongly acid, mottled light gray and red clay loam that has brownish yellow mottles

Substratum:

59 to 64 inches, very strongly acid, mottled strong brown, brownish yellow, yellowish red, and light brownish gray loam

Important soil properties—

Available water capacity: high
Permeability: moderately slow
Drainage: well drained
Runoff: medium
Water table: at a depth of more than 6 feet throughout the year
Root zone: very deep
Shrink-swell potential: moderate in the subsoil
Hazard of water erosion: slight (K factor—.32; T factor—a maximum allowance of 5 tons per acre per year)
Prime farmland: yes (all the soil properties meet the criteria)

Included with this soil in mapping are small areas of Bernaldo, Eastwood, Elrose, Latex, Scottsville, and Wolfpen soils. Bernaldo, Latex, and Scottsville soils are in the lower gently sloping areas. Bernaldo soils have a loamy subsoil, and Latex and Scottsville soils are loamy in the upper part of the subsoil and clayey in the lower part of the subsoil. Eastwood soils are gray in the lower part of the subsoil and are more sticky and plastic in the subsoil than the Meth soil. They are in landscape positions similar to those of the Meth soil or are on sloping to moderately steep side slopes. Elrose soils are loamy in the upper part of the subsoil and clayey in the lower part of the subsoil. They are in landscape positions similar to those of the Meth soil or are in the slightly lower gently sloping areas. Wolfpen soils have a sandy surface layer that is 20 to 40 inches thick and have a loamy subsoil. They are in gently sloping, convex areas on the higher ridgetops or are on moderately steep side slopes. Also included are some areas where the surface layer is loamy fine sand.

The contrasting Bernaldo, Latex, and Wolfpen soils make up less than 5 percent of the map unit. The other included soils are similar to the Meth soil and make up less than 20 percent of the map unit.

Areas of the Meth soil are used mainly as woodland or pasture. A few areas are used as cropland.

The wooded areas support hardwoods and pine. The commercial trees used for timber production are loblolly pine, slash pine, and shortleaf pine. Yields of loblolly pine are 280 board feet per acre per year over a 50-year period. Based on a 50-year site curve, the mean site index is 85 for loblolly pine and 76 for shortleaf pine.

Reforestation in cutover areas of loblolly pine and shortleaf pine occurs naturally where seed trees are in the stand. Reforestation also can be achieved by planting loblolly pine seedlings. When openings are made in the canopy, invading brush and hardwood species that are not controlled can delay the establishment or regeneration of pine. Selective thinning, removal of undesirable trees, and protection from wildfire increase yields.

This soil is suited to timber. No major limitations affect timber production. Using standard equipment that has wheels or tracks causes rutting and compaction when the soil is moist and displacement of the surface layer when the soil is dry. Puddling can occur during wet periods, making unsurfaced roads and skid trails slick and almost impassable.

Using low-pressure ground equipment minimizes soil damage and erosion and helps to maintain productivity. The proper design and careful construction of haul roads and care in the selection of sites for culverts and turnouts help to control erosion. Skid trails, firebreaks, and other areas where the surface is disturbed are subject to rilling and gullying. Revegetating the spoil

from excavations reduces the hazard of rill and gully erosion.

Suitable pasture grasses include bahiagrass, bermudagrass, Dallisgrass, tall fescue, and weeping lovegrass. Low inherent soil fertility is a limitation. The relationship between plant growth and soil moisture is good. Applications of fertilizer and lime and controlled grazing improve yields and help to control erosion. Cool-season legumes, such as arrowleaf clover, white clover, singletary peas, and hairy vetch, provide winter forage and add nitrogen to the soil.

This soil is suitable for corn, grain sorghum, and truck crops, such as peas. Where the plant cover is inadequate, erosion is a hazard. Conservation tillage, terraces, and contour farming help to prevent excessive erosion. Crop growth may be limited by an insufficient amount of water during dry periods in summer. The soil is suited to several kinds of horticultural crops. Crop residue management is needed to maintain the content of organic matter and improve tilth. The soil can be tilled throughout a wide range in moisture content. Applications of lime and fertilizer improve yields.

Urban uses are affected by several soil factors. Because of the moderate shrink-swell potential in the subsoil, building foundations can crack. The moderately slow permeability in the subsoil keeps septic tank absorption fields from operating satisfactorily. Low strength is a problem on sites for local roads and streets. Coating pipe and treating concrete minimize corrosion. Seepage may be a problem in pond reservoir areas. The limitations on sites for lawns are slight. Proper design and careful installation of structures can help to overcome or modify any hazards or limitations.

The suitability of this soil for most recreational uses is limited by the restricted permeability in the subsoil. The native vegetation provides good habitat for game birds, songbirds, small furbearers, and deer. Seed-producing grasses, forbs, shrubs, and nut-bearing trees provide ample food and shelter for most kinds of wildlife. Whitetail deer, bobwhite quail, mourning dove, and songbirds feed in the many open pastures and fields. They benefit from the security of the surrounding woodland cover.

The capability subclass is 2e. The woodland ordination symbol is 8A.

Mm—Mooreville-Mantachie complex, frequently flooded. These nearly level soils are on flood plains, mainly along the Sabine River and Cypress Bayou in the western part of the county. Slopes are 0 to 1 percent. Individual areas range from 100 to 5,000 acres in size and average about 1,000 acres in size.

The Mooreville soil is on natural levees bordering stream channels and along old sloughs or oxbows. The Mantachie soil is on the low flats adjacent to side slopes, in oxbow channels, and on concave flats away from the main channels.

This complex is about 50 percent Mooreville soil, 35 percent Mantachie soil, and 15 percent other soils. Individual areas range from 40 to 60 percent Mooreville soil, from 25 to 50 percent Mantachie soil, and from 10 to 30 percent other soils. The Mooreville and Mantachie soils occur as areas so intricately mixed that mapping them separately is not practical at the scale selected for mapping.

The typical sequence, depth, and composition of the layers of the Mooreville soil are as follows—

Surface layer:

0 to 6 inches, very strongly acid, dark brown loam that has few light brownish gray and yellowish red mottles

Subsoil:

6 to 16 inches, very strongly acid, dark brown loam that has few dark yellowish brown mottles

16 to 27 inches, very strongly acid, yellowish brown loam that has common light brownish gray and brown mottles

27 to 52 inches, very strongly acid, gray loam that has common yellowish brown mottles and few yellowish red mottles

52 to 80 inches, very strongly acid, gray loam that has few red, strong brown, yellowish brown, and yellowish red mottles

Important properties of the Mooreville soil—

Available water capacity: high
Permeability: moderate
Drainage: moderately well drained
Runoff: slow
Water table: perched at a depth of 1.5 to 3.0 feet during some periods in winter and spring
Flooding: frequent, occurring mostly from January through March and lasting from a few hours to a few days
Root zone: very deep
Shrink-swell potential: moderate
Hazard of water erosion: slight (K factor—.37; T factor—a maximum allowance of 5 tons per acre per year)
Prime farmland: no (because of the wetness and the frequent flooding)

The typical sequence, depth, and composition of the layers of the Mantachie soil are as follows—

Surface layer:

0 to 8 inches, very strongly acid, grayish brown loam that has few strong brown mottles

Subsoil:
- 8 to 13 inches, very strongly acid, mottled dark brown and grayish brown loam that has few yellowish brown and light brownish gray mottles
- 13 to 23 inches, very strongly acid, grayish brown loam that has common dark brown and gray mottles
- 23 to 36 inches, very strongly acid, light brownish gray loam that has common very dark gray, dark brown, dark gray, and yellowish red mottles
- 36 to 55 inches, very strongly acid, gray loam that has strong brown, brown, and yellowish brown mottles
- 55 to 80 inches, very strongly acid, gray clay loam that has strong brown, yellowish brown, and brown mottles

Important properties of the Mantachie soil—

Available water capacity: high
Permeability: moderate
Drainage: somewhat poorly drained
Runoff: slow
Water table: at a depth of 1.0 to 1.5 feet during some periods in winter and spring
Flooding: frequent, occurring mostly from January through March and lasting from a few hours to several days
Root zone: very deep
Shrink-swell potential: low
Hazard of water erosion: slight; (K factor—.28; T factor—a maximum allowance of 5 tons per acre per year)
Prime farmland: no (because of the wetness and the frequent flooding)

Included with these soils in mapping are small areas of Bernaldo, Bibb, Cart, Estes, Iuka, Latch, Nugent, and Socagee soils. Bernaldo soils have a loamy subsoil. They are on low terraces. Bibb and Iuka soils have a coarse-loamy subsoil. They are in landscape positions similar to those of the Mooreville and Mantachie soils. Cart soils are loamy in the upper part of subsoil and are brittle in the lower part of the subsoil. They are on mounded terraces. Estes soils are clayey. They are near the Sabine River, in landscape positions similar to those of the Mooreville and Mantachie soils. Nugent soils are sandy. They are on point bars along the Sabine River. Socagee soils are gray throughout. They are poorly drained and are in landscape positions similar to those of the Mooreville and Mantachie soils or are in the slightly lower positions.

The contrasting Bernaldo, Cart, Latch, and Nugent soils make up less than 10 percent of the map unit. The other included soils are similar to the Mooreville and Mantachie soils and make up less than 30 percent of the map unit. Also included are some areas that have recent overwash of very fine sandy loam.

Areas of the Mooreville and Mantachie soils are used mainly as woodland or pasture.

The wooded areas support hardwoods and pine. The commercial trees used for timber production are willow oak and loblolly pine. Yields of loblolly pine are 380 board feet per acre per year over a 50-year period on the Mooreville soil and 410 board feet per acre per year over a 50-year period on the Mantachie soil. Based on a 50-year site curve, the mean site index for loblolly pine is 95 on the Mooreville soil and 98 on the Mantachie soil.

Reforestation in cutover areas of loblolly pine and shortleaf pine occurs naturally where seed trees are in the stand. Reforestation also can be achieved by planting loblolly pine seedlings. When openings are made in the canopy, invading brush and hardwood species that are not controlled can delay the establishment or regeneration of pine. Selective thinning, removal of undesirable trees, and protection from wildfire increase yields.

A few problems affect timber production. Seedling mortality may be significant because of flooding or a seasonal high water table. Root development may be restricted because of the seasonal high water table. Trees are occasionally subject to windthrow during periods when the soils are wet. Because of the seasonal high water table, the use of equipment may be restricted to midsummer, when the soils are dry. Using standard equipment that has wheels or tracks causes rutting and compaction when the soils are moist and displacement of the surface layer when the soils are dry. Puddling can occur during wet periods, making unsurfaced roads and skid trails slick and almost impassable.

Using low-pressure ground equipment minimizes soil damage and erosion and helps to maintain productivity. The proper design and careful construction of haul roads and care in the selection of sites for culverts and turnouts help to control erosion. Skid trails, firebreaks, and other areas where the surface is disturbed are subject to rilling and gullying. Revegetating the spoil from excavations reduces the hazard of rill and gully erosion.

Suitable pasture grasses include bahiagrass, Dallisgrass, and tall fescue. Low inherent soil fertility is a limitation. Wetness and flooding limit the use of some kinds of equipment, limit grass production, and restrict grazing during some periods in most years. Applications of fertilizer and lime, controlled grazing, and a surface drainage system improve yields and help to control erosion. Cool-season legumes, such as white clover

and singletary peas, provide winter forage and add nitrogen to the soils.

These soils are not suitable for cropping because of flooding and wetness.

These soils are not suitable for urban uses. Wetness and flooding are severe limitations on sites for buildings, septic tank absorption fields, local roads and streets, and lawns. Overcoming these limitations generally is impractical. Low strength is a problem on sites for local roads and streets. Coating pipe and treating concrete minimize corrosion. Seepage may be a problem in pond reservoir areas, but proper design and careful construction can help to overcome this limitation.

The suitability of these soils for most recreational uses is limited by wetness and flooding. The soils provide habitat for many animals. Ducks and other waterfowl use ponded areas. Deer and squirrels can find adequate food and cover. Many songbirds and the pileated woodpecker use areas of these soils for nesting.

The capability subclass is 5w. The woodland ordination symbol is 10W.

Nu—Nugent loam, frequently flooded. This gently sloping, frequently flooded soil is on flood plains along the Sabine River. Slopes range from 0 to 2 percent. Individual areas are narrow and short and occur as point bars. They range from 5 to 40 acres in size and average about 20 acres.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 6 inches, strongly acid, dark yellowish brown loam that has common pale brown and brownish yellow mottles

Subsurface layer:

6 to 13 inches, very strongly acid, yellowish brown loamy fine sand that has common brownish mottles

Substratum:

13 to 56 inches, strongly acid, yellowish brown fine sand that has few yellow mottles and has common bedding planes

56 to 80 inches, very strongly acid, brown fine sand that has common yellow mottles and has few bedding planes

Important soil properties—

Available water capacity: moderate
Permeability: moderately rapid
Drainage: excessively drained
Runoff: slow
Water table: at a depth of about 3.5 to 6.0 feet during parts of winter and spring and below a depth of 6.0 feet during the rest of the year
Flooding: frequent, occurring after periods of heavy rainfall in any month and lasting for a few hours to several days
Root zone: very deep
Shrink-swell potential: low
Hazard of water erosion: slight (K factor—.37; T factor—a maximum allowance of 5 tons per acre per year)
Prime farmland: no (because of the available water capacity and the frequent flooding)

Included with this soil in mapping are small areas of Bibb, Bienville, Estes, Iuka, Latch, Mantachie, Mooreville, and Socagee soils. Bibb and Iuka soils are wetter than the Nugent soil and are mainly on narrow flood plains. Bienville soils are in the slightly higher landscape positions and are not subject to flooding. Estes soils are clayey. They are on broad flood plains. Mantachie and Mooreville soils have a loamy subsoil. They are in the slightly higher areas and are subject to flooding. Socagee soils are in old sloughs on low terraces. Also included are areas where the surface layer is loamy fine sand, fine sandy loam, or loam.

The contrasting Estes, Mantachie, Mooreville, and Socagee soils make up less than 10 percent of the map unit. The other included soils are similar to the Nugent soil and make up less than 10 percent of the map unit.

Areas of the Nugent soil are used mainly as woodland or native pasture.

Where the point bars have been stabilized, vegetation grows well on this soil. The wooded areas mainly support hardwoods. Pine grows in a few areas. The commercial trees used for timber production are loblolly pine, shortleaf pine, willow oak, and water oak. Yields of loblolly pine are 330 board feet per acre per year over a 50-year period. Based on a 50-year site curve, the mean site index for loblolly pine is 90.

Reforestation in cutover areas of loblolly pine and shortleaf pine occurs naturally where seed trees are in the stand. Reforestation in cutover areas of oaks occurs naturally where mast trees are in the stand. When openings are made in the canopy, invading brush and undesirable hardwood species that are not controlled can delay the establishment or regeneration of desirable hardwoods or pine. Selective thinning, removal of undesirable trees, and protection from wildfire increase yields.

Excessive drainage is the most severe limitation affecting timber production and harvesting. The low available water capacity limits the survival of seedlings. Seedling survival also is limited when flooding occurs.

Using standard equipment that has wheels or tracks causes rutting and compaction when the soil is moist and displacement of the surface layer when the soil is dry. Using low-pressure ground equipment minimizes soil damage and erosion and helps to maintain productivity. The proper design and careful construction of haul roads and care in the selection of sites for culverts and turnouts help to control erosion. Skid trails, firebreaks, and other areas where the surface is disturbed are subject to rilling and gullying. Revegetating the spoil from excavations reduces the hazard of rill and gully erosion.

Suitable pasture grasses include bahiagrass, Dallisgrass, and tall fescue. Low inherent soil fertility is a limitation. Flooding limits the use of some kinds of equipment, limits grass production, and restricts grazing during some periods in most years. Applications of fertilizer and lime and controlled grazing improve yields and help to control erosion. Cool-season legumes, such as white clover and singletary peas, provide winter forage and add nitrogen to the soil.

This soil is unsuitable for cropping because of the frequent flooding. It is too droughty and is flooded too frequently for most horticultural crops.

This soil is unsuitable for most urban uses. Flooding keeps septic tank absorption fields from operating properly. It is a severe hazard on sites for buildings and for local roads and streets. Overcoming this hazard generally is impractical. Coating pipe and treating concrete minimize corrosion.

The suitability of this soil for most recreational uses is limited because of flooding. The soil provides habitat for many animals. Deer, squirrel, and songbirds find adequate food and cover.

The capability subclass is 5w. The woodland ordination symbol is 9S.

PkC—Pickton loamy fine sand, 2 to 5 percent slopes. This gently sloping soil is on broad interstream divides and slightly oblong ridges in the uplands. The surface is plane to convex. Individual areas range from 15 to 200 acres in size and average about 50 acres.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
- 0 to 7 inches, medium acid, dark brown loamy fine sand

Subsurface layer:
- 7 to 28 inches, medium acid, yellowish brown loamy fine sand
- 28 to 50 inches, medium acid, brown loamy fine sand
- 50 to 70 inches, medium acid, yellowish brown loamy fine sand

Subsoil:
- 70 to 83 inches, slightly acid, yellowish red sandy clay loam that has common yellowish brown and many red mottles
- 83 to 96 inches, strongly acid, red sandy clay loam that has common yellowish brown and strong brown mottles

Important soil properties—

Available water capacity: low
Permeability: moderate
Drainage: well drained
Runoff: very slow
Water table: perched at a depth of 4 to 6 feet during some periods from January through March
Root zone: very deep
Shrink-swell potential: low
Hazard of water erosion: slight (K factor—.17; T factor—a maximum allowance of 5 tons per acre per year)
Prime farmland: no (because of the available water capacity)

Included with this soil in mapping are small areas of Bernaldo, Bibb, Cuthbert, Darden, Eastwood, Iuka, and Wolfpen soils. Bernaldo soils have a loamy subsoil within 20 inches of the surface. They are in the lower landscape positions. Bibb and Iuka soils are stratified throughout. They are on bottom land and are subject to flooding. Cuthbert and Eastwood soils have a clayey subsoil. They are in convex areas and on side slopes. Darden and Wolfpen soils are in landscape positions similar to those of the Pickton soil. Darden soils are sandy throughout, and Wolfpen soils have a sandy surface layer that is 20 to 40 inches thick.

The contrasting Bernaldo, Bibb, Cuthbert, Eastwood, and Iuka soils make up less than 5 percent of the map unit. The other included soils are similar to the Pickton soil and make up less than 15 percent of the map unit.

Areas of the Pickton soil are used mainly as woodland. A few areas are used as pasture.

The wooded areas support hardwoods and pine. The commercial trees used for timber production are loblolly pine, slash pine, and shortleaf pine. Yields of loblolly pine are 280 board feet per acre per year over a 50-year period. Based on a 50-year site curve, the mean site index is 85 for loblolly pine and 75 for shortleaf pine.

Reforestation in cutover areas of loblolly pine and shortleaf pine occurs naturally where seed trees are in the stand. Reforestation also can be achieved by planting loblolly pine seedlings. When openings are made in the canopy, invading brush and hardwood

species that are not controlled can delay the establishment or regeneration of pine. Selective thinning, removal of undesirable trees, and protection from wildfire increase yields.

A few problems affect timber production. Seedling mortality may be significant because of droughtiness in this sandy soil. Larger or containerized nursery stock may be needed rather than the usual bare root stock. The loose, sandy surface layer hinders the use of wheeled equipment, especially when the soil is very dry. Using standard equipment that has wheels or tracks causes rutting and compaction when the soil is moist and displacement of the surface layer when the soil is dry.

Using low-pressure ground equipment minimizes soil damage and erosion and helps to maintain productivity. The proper design and careful construction of haul roads and care in the selection of sites for culverts and turnouts help to control erosion. Skid trails, firebreaks, and other areas where the surface is disturbed are subject to rilling and gullying. Revegetating the spoil from excavations reduces the hazard of rill and gully erosion.

Suitable pasture grasses include bermudagrass and weeping lovegrass. Low inherent soil fertility is a limitation. Although only low amounts of soil moisture are held in the profile, most of the moisture is readily available to plants. Obtaining a firm seedbed is difficult. Emerging grass seedlings can be killed by windblown sand unless cultural practices are applied. The soil is well suited to grazing in winter and in wet periods. Applications of fertilizer and lime and controlled grazing improve yields and help to control erosion. Cool-season legumes, such as hairy vetch, provide winter forage and add nitrogen to the soil.

This soil is suitable for peas, corn, and watermelons. Where the plant cover is inadequate or the slope exceeds 3 percent, erosion is a hazard. Conservation tillage, terraces, and contour farming help to prevent excessive erosion. Crop growth may be limited by a lack of water during dry periods because of the low available water capacity in the upper part of the soil. The soil generally is not suited to horticultural crops. If these crops were grown, special management and careful plant selection would be required. Crop residue management is needed to maintain the content of organic matter and improve tilth. The soil can be tilled throughout a wide range in moisture content. Applications of lime and fertilizer improve yields.

Urban uses are affected by several soil factors. The rapid permeability in the topsoil keeps septic tank absorption fields from operating satisfactorily. Coating pipe and treating concrete minimize corrosion. Droughtiness and the slope may be limitations on sites for lawns. Seepage may be a problem in pond reservoir areas. Proper design and careful installation of structures can help to overcome or modify any hazards or limitations.

The suitability of this soil for most recreational uses is limited by the sandy surface layer. The native vegetation provides good habitat for game birds, songbirds, small furbearers, and deer. Seed-producing grasses, forbs, shrubs, and nut-bearing trees provide ample food and shelter for most kinds of wildlife. Whitetail deer, bobwhite quail, mourning dove, and songbirds feed in the many open pastures and fields. They benefit from the security of the surrounding woodland cover.

The capability subclass is 3s. The woodland ordination symbol is 8S.

PkE—Pickton loamy fine sand, 8 to 15 percent slopes. This strongly sloping and moderately steep soil is on side slopes in the uplands. The surface is plane or weakly convex. Individual areas range from 20 to 200 acres in size and average about 100 acres.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 3 inches, medium acid, brown loamy fine sand

Subsurface layer:

3 to 12 inches, medium acid, yellowish brown loamy fine sand

12 to 50 inches, medium acid, light yellowish brown loamy fine sand

Subsoil:

50 to 62 inches, very strongly acid, strong brown sandy clay loam

62 to 70 inches, very strongly acid, reddish yellow fine sandy loam

70 to 80 inches, very strongly acid, reddish yellow fine sandy loam that has common strong brown mottles

Important soil properties—

Available water capacity: low
Permeability: moderate
Drainage: well drained
Runoff: very slow
Water table: at a depth of 4 to 6 feet during winter and spring and below a depth of 6 feet during the rest of the year
Root zone: very deep
Shrink-swell potential: low
Hazard of water erosion: moderate (K factor—.17; T

factor—a maximum allowance of 5 tons per acre per year)

Prime farmland: no (because of the available water capacity and the slope)

Included with this soil in mapping are small areas of Bernaldo, Bibb, Cuthbert, Darden, Eastwood, Iuka, Mantachie, Mooreville, and Wolfpen soils. Bernaldo soils have a surface layer that is less than 20 inches thick. They are on gently sloping toe slopes. Bibb, Iuka, Mantachie, and Mooreville soils are on bottom land and are subject to flooding. Bibb and Iuka soils are stratified throughout. Mantachie and Mooreville soils are not characterized by an increase in content of clay in the subsoil and are gray. Cuthbert and Eastwood soils have a clayey subsoil. They are on strongly sloping and moderately steep side slopes. Darden and Wolfpen soils are in landscape positions similar to those of the Pickton soil. Darden soils are sandy throughout, and Wolfpen soils have a surface layer that is 20 to 40 inches thick.

The contrasting Bernaldo, Bibb, Cuthbert, Eastwood, Iuka, Mantachie, and Mooreville soils make up less than 5 percent of the map unit. The other included soils are similar to the Pickton soil and make up less than 20 percent of the map unit.

Areas of the Pickton soil are used mainly as woodland. A few areas are used as pasture.

The wooded areas support hardwoods and pine. The commercial trees used for timber production are loblolly pine, slash pine, and shortleaf pine. Yields of loblolly pine are 280 board feet per acre per year over a 50-year period. Based on a 50-year site curve, the mean site index is 85 for loblolly pine and 75 for shortleaf pine.

Reforestation in cutover areas of loblolly pine and shortleaf pine occurs naturally where seed trees are in the stand. Reforestation also can be achieved by planting loblolly pine seedlings. When openings are made in the canopy, invading brush and hardwood species that are not controlled can delay the establishment or regeneration of pine. Selective thinning, removal of undesirable trees, and protection from wildfire increase yields.

A few problems affect timber production. Seedling mortality may be significant because of droughtiness in this sandy soil. Larger or containerized nursery stock may be needed rather than the usual bare root stock. The loose, sandy surface layer hinders the use of wheeled equipment, especially when the soil is very dry. Using standard equipment that has wheels or tracks causes rutting and compaction when the soil is moist and displacement of the surface layer when the soil is dry. The slope can limit the use of equipment.

Because of the slope, excessive erosion can occur unless the soil is protected. Using low-pressure ground equipment minimizes soil damage and erosion and helps to maintain productivity. The proper design and careful construction of haul roads and care in the selection of sites for culverts and turnouts help to control erosion. Skid trails, firebreaks, and other areas where the surface is disturbed are subject to rilling and gullying. Revegetating the spoil from excavations reduces the hazard of rill and gully erosion.

Suitable pasture grasses include bermudagrass and weeping lovegrass. Low inherent soil fertility is a limitation. Although only low amounts of soil moisture are held in the profile, most of the moisture is readily available to plants. Obtaining a firm seedbed is difficult. Emerging grass seedlings can be killed by windblown sand unless cultural practices are applied. The soil is well suited to grazing in winter and in wet periods. Applications of fertilizer and lime and controlled grazing improve yields and help to control erosion. Cool-season legumes, such as hairy vetch, provide winter forage and add nitrogen to the soil.

This soil is not suitable for cropping. It is susceptible to excessive erosion because of the slope, and it has a low available water capacity in the upper part. It generally is not suited to horticultural crops. If these crops were grown, special management and careful plant selection would be required. Crop residue management is needed to maintain the content of organic matter and improve tilth. Applications of lime and fertilizer improve yields.

Urban uses can be affected by several soil factors. Extensive excavation and filling may be needed during construction because of the slope. The rapid permeability in the topsoil keeps septic tank absorption fields from operating satisfactorily. The slope hinders the construction of local roads and streets. Coating pipe and treating concrete minimize corrosion. Droughtiness and the slope may be limitations on sites for lawns. Seepage may be a problem in pond reservoir areas. Proper design and careful installation of structures can help to overcome or modify any hazards or limitations.

The suitability of this soil for most recreational uses is limited by the sandy surface layer and the slope. The native vegetation provides good habitat for game birds, songbirds, small furbearers, and deer. Seed-producing grasses, forbs, shrubs, and nut-bearing trees provide ample food and shelter for most kinds of wildlife. Whitetail deer, bobwhite quail, mourning dove, and songbirds feed in the many open pastures and fields. They benefit from the security of the surrounding woodland cover.

The capability subclass is 6e. The woodland ordination symbol is 8S.

PrB—Pirkey very fine sandy loam, 1 to 3 percent slopes. This very gently sloping soil is in reclaimed areas that formerly were strip-mined. It is mainly in areas of the Reklaw Formation and Carrizo Sand. The surface is plane to convex and has been contoured so that the original landscape is restored. Individual areas range from 25 to 200 acres in size.

This soil formed in mixed oxidized material. This material has been separated from unoxidized material in at least the upper 4 feet of the soil. Dozers and graders have placed the upper oxidized material over the unoxidized material. In most areas, ripping has improved the soil-water relationship in the upper 40 inches and at least 6 inches of topsoil has been added to the surface. Unoxidized material and lignite fragments generally are scarce, but they make up as much as 10 percent of the volume.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
- 0 to 10 inches, medium acid, dark brown very fine sandy loam

Subsoil:
- 10 to 15 inches, very strongly acid, yellowish red sandy clay loam that has few yellowish brown spots and few light gray shale fragments
- 15 to 21 inches, very strongly acid, red fine sandy loam that has few yellowish brown spots and few light gray shale fragments
- 21 to 31 inches, very strongly acid, mottled yellowish red and brownish yellow sandy clay loam that has few light gray shale fragments
- 31 to 48 inches, very strongly acid, yellowish red sandy clay loam

Substratum:
- 48 to 80 inches, ultra acid, dark grayish brown clay loam that has few brownish yellow mottles and has common lignite fragments and partings

Important soil properties—

Available water capacity: high
Permeability: slow
Drainage: well drained
Runoff: medium
Water table: at a depth of more than 6 feet throughout the year, but perched at the contact between the substratum and the subsoil in some areas
Root zone: very deep, but root development is limited by very low pH at a depth of 48 to 60 inches
Shrink-swell potential: moderate
Hazard of water erosion: moderate (K factor—.37; T factor—a maximum allowance of 4 tons per acre per year)
Prime farmland: no (because the sustained production potential has not been determined)

Included with this soil in mapping are small areas of Bernaldo, Bibb, Bowie, Cart, Cuthbert, Erno, Iuka, Kirvin, Latch, Sacul, and Sawyer soils. All of these included soils have developed horizons and have not been disturbed by mining activities. Bernaldo, Bowie, Cart, Cuthbert, Erno, Kirvin, Sacul, and Sawyer soils are in landscape positions similar to those of the Pirkey soil. Bibb and Iuka soils are on bottom land and are subject to flooding. Latch soils are on first terraces above the bottom land. Also included are a few areas of soils that have a clayey subsoil and areas of soils that are similar to the Pirkey soil but have a surface layer of fine sandy loam, loam, clay loam, or sandy clay loam.

The contrasting Bibb, Cart, Cuthbert, Iuka, Kirvin, Latch, Sacul, and Sawyer soils make up less than 5 percent of the map unit. The other included soils are similar to the Pirkey soil and make up less than 5 percent of the map unit.

Areas of the Pirkey soil are used mainly as pasture.

Woodland plantings are being tested on this soil. The commercial trees used for timber production are loblolly pine and shortleaf pine. Estimated yields of loblolly pine are 230 board feet per acre per year over a 50-year period. The estimated mean site index for loblolly pine is 80.

Suitable pasture grasses include bahiagrass, bermudagrass, and weeping lovegrass. Low inherent soil fertility is a limitation. Applications of fertilizer and lime improve yields and help to control erosion. Cool-season legumes, such as arrowleaf clover, white clover, singletary peas, and hairy vetch, provide winter forage and add nitrogen to the soil.

This soil is suitable for some crops. Where the plant cover is inadequate, erosion is a hazard. Conservation tillage, terraces, and contour farming help to prevent excessive erosion. Crop growth may be limited by a lack of water during dry periods in summer. The soil is suited to some horticultural crops. Crop residue management is needed to maintain the content of organic matter and improve tilth. Applications of lime and fertilizer improve yields.

Urban uses are affected by several soil factors. Because of the moderate shrink-swell potential and the possibility of unstable fill, building foundations can crack. The slow permeability can keep septic tank absorption fields from operating properly. Low strength, the moderate shrink-swell potential, and the possibility of unstable fill are problems on sites for local roads and streets. Coating pipe and treating concrete minimize

corrosion. The limitations affecting lawns are slight. Proper design and careful installation of structures can help to overcome or modify any hazards or limitations.

The suitability of this soil for most recreational uses is limited by the restricted permeability. The kinds of native plants and the number of game birds, songbirds, small furbearers, and deer are limited.

The capability subclass is 3e. The woodland ordination symbol is 8A.

PrC—Pirkey very fine sandy loam, 3 to 5 percent slopes. This gently sloping soil is in reclaimed areas that formerly were strip-mined. It is mainly in areas of the Reklaw Formation and Carrizo Sand. The surface is plane to convex and has been contoured so that the original landscape is restored. Individual areas range from 25 to 300 acres in size.

This soil formed in mixed oxidized material. This material has been separated from unoxidized material in at least the upper 4 feet of the soil. Dozers and graders have placed the upper oxidized material over the unoxidized material. In most areas, ripping has improved the soil-water relationship in the upper 40 inches and at least 6 inches of topsoil has been added to the surface. Unoxidized material and lignite fragments generally are scarce, but they make up as much as 10 percent of the volume.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 6 inches, slightly acid, brown very fine sandy loam

Subsoil:

6 to 16 inches, very strongly acid, yellowish brown sandy clay loam that has common yellowish red spots and has few light brownish gray shale fragments

16 to 35 inches, very strongly acid, strong brown sandy clay loam that has common yellowish red and few brownish yellow spots and has few light brownish gray and light gray shale fragments

35 to 42 inches, very strongly acid, brownish yellow sandy clay loam that has common yellowish red spots and has few light gray shale fragments

42 to 57 inches, very strongly acid, mottled yellowish red and yellowish brown sandy clay loam that has few light yellowish brown spots and has few strata of light brownish gray shale fragments

Substratum:

57 to 80 inches, ultra acid, very dark gray clay loam that has common yellowish brown spots and has common lignite fragments

Important soil properties—

Available water capacity: high
Permeability: slow
Drainage: well drained
Runoff: medium
Water table: at a depth of more than 6 feet throughout the year, but perched at the contact between the subsoil and the substratum in some areas
Root zone: very deep, but root development is limited by very low pH at a depth of 48 to 60 inches
Shrink-swell potential: moderate
Hazard of water erosion: moderate (K factor—.37; T factor—a maximum allowance of 4 tons per acre per year)
Prime farmland: no (because the sustained production potential has not been determined)

Included with this soil in mapping are small areas of Bernaldo, Bibb, Bowie, Cart, Cuthbert, Erno, Iuka, Kirvin, Latch, Sacul, and Sawyer soils. All of these included soils have developed horizons and have not been disturbed by mining activities. Bernaldo, Bowie, Cart, Cuthbert, Erno, Kirvin, Sacul, and Sawyer soils are in landscape positions similar to those of the Pirkey soil. Bibb and Iuka soils are on bottom land and are subject to flooding. Latch soils are on first terraces above the bottom land. Also included are a few areas of soils that have a clayey subsoil and areas of soils that are similar to the Pirkey soil but have a surface layer of fine sandy loam, loam, clay loam, or sandy clay loam.

The contrasting Bibb, Cart, Cuthbert, Iuka, Kirvin, Latch, Sacul, and Sawyer soils make up less than 5 percent of the map unit. The other included soils are similar to the Pirkey soil and make up less than 5 percent of the map unit.

Areas of the Pirkey soil are used mainly as pasture.

Woodland plantings are being tested on this soil. The commercial trees used for timber production are loblolly pine and shortleaf pine. Estimated yields of loblolly pine are 230 board feet per acre per year over a 50-year period. The estimated mean site index for loblolly pine is 80.

Suitable pasture grasses include bahiagrass, bermudagrass, and weeping lovegrass. Low inherent soil fertility is a limitation. Applications of fertilizer and lime improve yields and help to control erosion. Cool-season legumes, such as arrowleaf clover, white clover, singletary peas, and hairy vetch, provide winter forage and add nitrogen to the soil.

This soil is suitable for some crops. Where the plant cover is adequate, erosion is a hazard. Conservation tillage, terraces, and contour farming help to prevent

excessive erosion. Crop growth may be limited by a lack of water during dry periods in summer. The soil is suited to some horticultural crops. Crop residue management is needed to maintain the content of organic matter and improve tilth. Applications of lime and fertilizer improve yields.

Urban uses are affected by several soil factors. Because of the moderate shrink-swell potential and the possibility of unstable fill, building foundations can crack. The slow permeability can keep septic tank absorption fields from operating properly. Low strength, the moderate shrink-swell potential, and the possibility of unstable fill are problems on sites for local roads and streets. Coating pipe and treating concrete minimize corrosion. The slope may be a problem in pond reservoir areas. The limitations affecting lawns are slight. Proper design and careful installation of structures can help to overcome or modify any hazards or limitations.

The suitability of this soil for most recreational uses is limited by the restricted permeability. The kinds of native plants and the number of game birds, songbirds, small furbearers, and deer are limited.

The capability subclass is 4e. The woodland ordination symbol is 8A.

PrE—Pirkey very fine sandy loam, 8 to 12 percent slopes. This strongly sloping soil is in reclaimed areas that formerly were strip-mined. It is mainly in areas of the Reklaw Formation and Carrizo Sand. The surface is plane to convex and has been contoured so that the original landscape is restored. Individual areas range from 50 to 200 acres in size.

This soil formed in mixed oxidized material. This material has been separated from unoxidized material in at least the upper 4 feet of the soil. Dozers and graders have placed the upper oxidized material over the unoxidized material. In most areas, ripping has improved the soil-water relationship in the upper 40 inches and at least 6 inches of topsoil has been added to the surface. Unoxidized material and lignite fragments generally are scarce, but they make up as much as 10 percent of the volume.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 8 inches, mildly alkaline (recently limed), dark yellowish brown very fine sandy loam

Subsoil:

8 to 36 inches, very strongly acid, mottled yellowish brown and yellowish red sandy clay loam that has few light brownish gray shale fragments

36 to 54 inches, very strongly acid, light yellowish brown sandy clay loam that has common brownish yellow and few light brownish gray shale fragments

Substratum:

54 to 80 inches, very strongly acid, mottled gray and light gray sandy clay loam that has common yellowish brown spots and few lignite fragments

Important soil properties—

Available water capacity: high
Permeability: slow
Drainage: well drained
Runoff: rapid
Water table: at a depth of more than 6 feet throughout the year, but perched at the contact between the subsoil and the substratum in some areas
Root zone: very deep, but root development is limited by very low pH at a depth of 48 to 60 inches
Shrink-swell potential: moderate
Hazard of water erosion: moderate (K factor—.37; T factor—a maximum allowance of 4 tons per acre per year)
Prime farmland: no (because of the slope and the hazard of water erosion; also because the sustained production potential has not been determined)

Included with this soil in mapping are small areas of Bernaldo, Bowie, Cart, Cuthbert, luka, Kirvin, Latch, Sacul, and Sawyer soils. All of these included soils have developed horizons and have not been disturbed by mining activities. They are contrasting soils and make up less than 10 percent of the map unit. Bernaldo, Bowie, Cart, Cuthbert, Kirvin, Sacul, and Sawyer soils are in landscape positions similar to those of the Pirkey soil. luka soils are on bottom land and are subject to flooding. Latch soils are on first terraces above the bottom land. Also included are a few areas of soils that have a clayey subsoil and areas of soils that are similar to the Pirkey soil but have a surface layer of fine sandy loam, loam, clay loam, or sandy clay loam.

Areas of the Pirkey soil are used mainly as pasture.

Woodland plantings are being tested on this soil. The commercial trees used for timber production are loblolly pine and shortleaf pine. Estimated yields of loblolly pine are 230 board feet per acre per year over a 50-year period. The estimated mean site index for loblolly pine is 80.

Suitable pasture grasses include bahiagrass, bermudagrass, and weeping lovegrass. Low inherent soil fertility is a limitation. Applications of fertilizer and lime improve yields and help to control erosion. Cool-season legumes, such as arrowleaf clover, white clover, singletary peas, and hairy vetch, provide winter forage and add nitrogen to the soil.

This soil is not suitable for cropping because of the slope and the hazard of erosion.

Urban uses can be affected by several soil factors. Many are affected by the slope. Because of the moderate shrink-swell potential and the possibility of unstable fill, building foundations can crack. The slow permeability can keep septic tank absorption fields from operating properly. Low strength, the moderate shrink-swell potential, and the possibility of unstable fill are problems on sites for local roads and streets. Coating pipe and treating concrete minimize corrosion. The slope may be a problem in pond reservoir areas. Proper design and careful installation of structures can help to overcome or modify any hazards or limitations.

The suitability of this soil for most recreational uses is limited by the restricted permeability. The kinds of native plants and the number of game birds, songbirds, small furbearers, and deer are limited.

The capability subclass is 6e. The woodland ordination symbol is 8A.

Pt—Pits and Dumps. This map unit consists of deep excavations and mounds of mixed soil and substratum material in areas that have been strip-mined for lignite or have been mined for clay and sand. Slopes range from 20 to 90 percent on the mounded dumps. Individual areas range from 5 to 100 acres in size and average about 50 acres.

This unit is about 30 percent Pits, 65 percent Dumps, and 5 percent included soils. Individual areas range from 20 to 30 percent Pits, from 60 to 75 percent Dumps, and from 5 to 10 percent included soils. The components do not occur in a regular pattern.

Pits were excavated during the mining of lignite, clay, or sand. They have moderately steep to vertical walls, are 15 to 70 feet deep, and commonly are partly filled with water in most years. Individual pits range from 3 to 20 acres in size.

Dumps are moderately steep to very steep mounds of soil and substratum material 10 to 40 feet high. The soil material is clayey, loamy, and sandy overburden or by-products of the mining activities. The original soil layers have been mixed to a depth of more than 80 inches. Strata of clay, sand, shale, shaly clay, and fragments of lignite and rock are throughout the soil material. Areas that have been mined for sand or clay may have lesser amounts of lignite. The dumps range from 2 to 15 acres in size.

Included in this unit in mapping are small areas of Bernaldo, Bowie, Cart, Cuthbert, Eastwood, Erno, and Iuka soils. These soils are primarily remnants untouched by the mining activities. Iuka soils are along stream channels.

Most areas are used as wildlife habitat. The pits contain water or do not support vegetation. The dumps have steep slopes and uneven terrain, making management impractical.

No capability subclass or woodland ordination symbol is assigned.

SaC—Sacul very fine sandy loam, 1 to 5 percent slopes. This gently sloping soil is on low uplands and side slopes. The surface is plane or weakly convex. Individual areas range from 20 to 1,000 acres in size and average about 200 acres.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 3 inches, medium acid, very dark grayish brown very fine sandy loam

Subsurface layer:
3 to 6 inches, medium acid, dark grayish brown very fine sandy loam

Subsoil:
6 to 16 inches, very strongly acid, dark red clay
16 to 30 inches, very strongly acid, red clay that has many light brownish gray and common strong brown mottles
30 to 43 inches, very strongly acid, grayish brown clay that has common red and strong brown mottles
43 to 55 inches, very strongly acid, mottled grayish brown, red, and strong brown clay loam

Substratum:
55 to 70 inches, very strongly acid, stratified light gray, strong brown, dark red, and dark grayish brown, weakly consolidated silt loam and clay loam in horizontally oriented bedding planes

Important soil properties—

Available water capacity: high
Permeability: slow
Drainage: moderately well drained
Runoff: medium
Water table: at a depth of 2 to 4 feet during some periods from December through April
Root zone: deep over siltstone
Shrink-swell potential: high
Hazard of water erosion: moderate (K factor—.32; T factor—a maximum allowance of 5 tons per acre per year)
Prime farmland: no (because of a low pH)

Included with this soil in mapping are small areas of Bowie, Cuthbert, Iuka, Kirvin, Mantachie, Mooreville, and Sawyer soils. Bowie soils have a loamy subsoil.

They are in the higher landscape positions. Cuthbert soils are on strongly sloping and moderately steep side slopes. Sawyer soils are loamy in the upper part of the subsoil. They are in landscape positions similar to those of the Sacul soil or are in the slightly higher positions. Iuka, Mantachie, and Mooreville soils are on flood plains. Kirvin soils have a subsoil that is less sticky and plastic than that of the Sacul soil. They are in landscape positions similar to those of the Sacul soil or are in the slightly higher convex areas.

The contrasting Bowie, Cuthbert, Iuka, Mantachie, and Mooreville soils make up less than 10 percent of the map unit. The other included soils are similar to the Sacul soil and make up less than 20 percent of the map unit.

Areas of the Sacul soil are used mainly as woodland or pasture.

The wooded areas support hardwoods and pine. The commercial trees used for timber production are loblolly pine, slash pine, and shortleaf pine. Yields of loblolly pine are 330 board feet per acre per year over a 50-year period. Based on a 50-year site curve, the mean site index is 90 for loblolly pine and 80 for shortleaf pine.

Reforestation in cutover areas of loblolly pine and shortleaf pine occurs naturally where seed trees are in the stand. Reforestation also can be achieved by planting loblolly pine seedlings. When openings are made in the canopy, invading brush and hardwood species that are not controlled can delay the establishment or regeneration of pine. Selective thinning, removal of undesirable trees, and protection from wildfire increase yields.

Some problems affect timber production. Using standard equipment that has wheels or tracks causes rutting and compaction when the soil is moist and displacement of the surface layer when the soil is dry. Because of the clayey subsoil, puddling can occur during wet periods, making unsurfaced roads and skid trails slick and almost impassable.

This soil is subject to excessive erosion unless it is protected. Using low-pressure ground equipment minimizes soil damage and erosion and helps to maintain productivity. The proper design and careful construction of haul roads and care in the selection of sites for culverts and turnouts help to control erosion. Skid trails, firebreaks, and other areas where the surface is disturbed are subject to rilling and gullying. Revegetating the spoil from excavations reduces the hazard of rill and gully erosion.

This soil is well suited to pasture grasses for grazing or hay. No major limitations affect these uses. Suitable pasture grasses include bahiagrass, bermudagrass, and weeping lovegrass. Low inherent soil fertility is a limitation. The soil is seasonally wet or droughty, and the relationship between plant growth and soil moisture is fair or poor. Applications of fertilizer and lime and controlled grazing improve yields and help to control erosion. Cool-season legumes, such as arrowleaf clover, crimson clover, white clover, singletary peas, and hairy vetch, provide winter forage and add nitrogen to the soil.

This soil is suitable for peas, corn, and grain sorghum. It is susceptible to excessive erosion because of the texture of the surface layer and the slope. The slowly permeable subsoil restricts the movement of air and water through the soil. Conservation tillage, terraces, and contour farming help to prevent excessive erosion. Crop growth may be limited by a lack of water during dry periods in summer. The soil generally is not suited to horticultural crops. If these crops were grown, special management and careful plant selection would be required. Crop residue management is needed to maintain the content of organic matter and improve tilth. The soil can be tilled only within a narrow range in moisture content. Applications of lime and fertilizer improve yields.

Urban uses are affected by several soil factors. Because of the high shrink-swell potential in the subsoil, building foundations can crack. The slow permeability in the subsoil keeps septic tank absorption fields from operating satisfactorily. Low strength and the shrink-swell potential are problems on sites for local roads and streets. Coating pipe and treating concrete minimize corrosion. The limitations affecting lawns are slight. Those that affect pond reservoir areas also are slight. Proper design and careful installation of structures can help to overcome or modify any hazards or limitations.

The suitability of this soil for most recreational uses is limited by the restricted permeability in the subsoil. The native vegetation provides good habitat for game birds, songbirds, small furbearers, and deer. Seed-producing grasses, forbs, shrubs, and nut-bearing trees provide ample food and shelter for most kinds of wildlife. Whitetail deer, bobwhite quail, mourning dove, and songbirds feed in the many open pastures and fields. They benefit from the security of the surrounding woodland cover.

The capability subclass is 4e. The woodland ordination symbol is 9C.

Sm—Sardis-Mathiston complex, frequently flooded. These nearly level soils are on flood plains. The surface is plane to concave on flats and plane to convex on ridges close to stream channels. Slopes are 0 to 1 percent. Individual areas range from 40 to 2,000 acres in size and average about 500 acres.

The Sardis soil is on low ridges bordering stream

channels. The Mathiston soil is on low flats adjacent to side slopes.

This complex is about 45 percent Sardis soil, 35 percent Mathiston soil, and 20 percent other soils. Individual areas range from 35 to 55 percent Sardis soil, from 30 to 50 percent Mathiston soil, and from 10 to 30 percent other soils. The Sardis and Mathiston soils occur as areas so intricately mixed that mapping them separately is not practical at the scale selected for mapping.

The typical sequence, depth, and composition of the layers of the Sardis soil are as follows—

Surface layer:
0 to 5 inches, very strongly acid, dark grayish brown loam that has grayish brown and yellowish brown mottles

Subsoil:
5 to 11 inches, very strongly acid, brown loam that has yellowish brown, gray, and strong brown mottles
11 to 24 inches, very strongly acid, brown loam that has light brownish gray mottles
24 to 33 inches, very strongly acid, light brownish gray silty clay loam that has light yellowish brown and brown mottles
33 to 60 inches, very strongly acid, gray silty clay loam that has reddish yellow, brownish yellow, and light olive brown mottles and has 1 to 2 percent black concretions
60 to 80 inches, medium acid, gray silty clay loam that has yellowish brown and dark yellowish brown mottles and has 1 to 2 percent black concretions and few soft, black masses

Important properties of the Sardis soil—

Available water capacity: high
Permeability: moderate
Drainage: somewhat poorly drained
Runoff: slow
Water table: at a depth of 1.5 to 3.0 feet during winter and spring and below a depth of 6.0 feet during the rest of the year
Flooding: frequent, occurring mostly from December through May and lasting from a few hours to several days
Root zone: very deep
Shrink-swell potential: low
Hazard of water erosion: slight (K factor—.37; T factor—a maximum allowance of 5 tons per acre per year)
Prime farmland: no (because of the frequent flooding)

The typical sequence, depth, and composition of the layers of the Mathiston soil are as follows—

Surface layer:
0 to 8 inches, very strongly acid, grayish brown loam that has yellowish brown and gray mottles

Subsoil:
8 to 14 inches, very strongly acid, brown silty clay loam that has grayish brown mottles
14 to 24 inches, very strongly acid, light brownish gray silty clay loam that has grayish brown, very dark grayish brown, and dark yellowish brown mottles
24 to 36 inches, very strongly acid, light brownish gray silty clay loam that has brownish yellow mottles and has 1 percent black concretions
36 to 80 inches, very strongly acid, grayish brown clay loam that has strong brown mottles and has 1 percent black concretions

Important properties of the Mathiston soil—

Available water capacity: very high
Permeability: moderate
Drainage: somewhat poorly drained
Runoff: slow
Water table: at a depth of 1.5 to 2.5 feet during winter and spring and below a depth of 6.0 feet during the rest of the year
Flooding: frequent, occurring mostly from December through May and lasting from a few hours to several days
Root zone: very deep
Shrink-swell potential: low
Hazard of water erosion: slight (K factor—.37; T factor—a maximum allowance of 5 tons per acre per year)
Prime farmland: no (because of the wetness and the frequent flooding)

Included with these soils in mapping are small areas of Bernaldo, Bonn, Cart, Cypress, Eastwood, Guyton, Iuka, Scottsville, and Socagee soils. Bernaldo and Iuka soils have a loamy subsoil. Bernaldo soils are on terraces. Iuka soils are in landscape positions similar to those of the Sardis and Mathiston soils. Bonn soils have high concentrations of sodium salts in the subsoil. They are on low terraces. Cart soils are loamy in the upper part of subsoil and are brittle in the lower part of the subsoil. They are on mounded terraces. Cypress soils have a clayey subsoil. They are in the lower areas in and around Caddo Lake and are submerged for most of the year. Eastwood soils have a clayey subsoil. They are on gently sloping to moderately steep side slopes. Guyton soils are on low terraces. Scottsville soils are loamy in the upper part of the subsoil and clayey in the lower part of the subsoil. They are on nearly level to gently sloping side slopes. Socagee soils are gray throughout. They are in landscape positions similar to

those of the Sardis and Mathiston soils or are in the slightly lower concave areas. Also included are areas of soils that have a surface layer of silt loam or silty clay loam and areas of soils that have neutral reaction in the lower part of the subsoil.

The contrasting Bernaldo, Bonn, Cart, Cypress, Eastwood, and Scottsville soils make up less than 5 percent of the map unit. The other included soils are similar to the Sardis and Mathiston soils and generally make up less than 20 percent of the map unit.

Areas of the Sardis and Mathiston soils are used mainly as woodland or pasture.

The wooded areas support hardwoods and pine. The commercial trees used for timber production are willow oak and loblolly pine. Yields of loblolly pine are 542 board feet per acre per year over a 50-year period on the Sardis soil and 380 board feet per acre per year over a 50-year period on the Mathiston soil. Based on a 50-year site curve, the mean site index for loblolly pine is 107 on the Sardis soil and 95 on the Mathiston soil.

Reforestation in cutover areas of loblolly pine and shortleaf pine occurs naturally where seed trees are in the stand. Reforestation also can be achieved by planting loblolly pine seedlings. When openings are made in the canopy, invading brush and hardwood species that are not controlled can delay the establishment or regeneration of pine. Selective thinning, removal of undesirable trees, and protection from wildfire increase yields.

A few problems affect timber production. Seedling mortality may be significant because of flooding and the seasonal high water table. Root development may be restricted because of the seasonal high water table. Trees are occasionally subject to windthrow during periods when the soils are wet. Because of the seasonal high water table, the use of equipment may be restricted to midsummer, when the soils are dry. Using standard equipment that has wheels or tracks causes rutting and compaction when the soils are moist and displacement of the surface layer when the soils are dry. Puddling can occur during wet periods, making unsurfaced roads and skid trails slick and almost impassable.

Using low-pressure ground equipment minimizes soil damage and erosion and helps to maintain productivity. The proper design and careful construction of haul roads and care in the selection of sites for culverts and turnouts help to control erosion. Skid trails, firebreaks, and other areas where the surface is disturbed are subject to rilling and gullying. Revegetating the spoil from excavations reduces the hazard of rill and gully erosion.

Suitable pasture grasses include bahiagrass, Dallisgrass, and tall fescue. Low inherent soil fertility is a limitation. Wetness and flooding limit the use of some kinds of equipment, limit grass production, and restrict grazing during some periods in most years. Applications of fertilizer and lime, controlled grazing, and a surface drainage system improve yields and help to control erosion. Cool-season legumes, such as white clover and singletary peas, provide winter forage and add nitrogen to the soil.

These soils are not suitable for cropping because of flooding and wetness.

These soils are not suitable for urban uses. Wetness and flooding are severe limitations on sites for buildings, septic tank absorption fields, local roads and streets, and lawns. Overcoming these limitations generally is impractical. Low strength is a problem on sites for local roads and streets. Coating pipe and treating concrete minimize corrosion. Seepage may be a problem in pond reservoir areas, but proper design and careful construction can help to overcome this limitation.

The suitability of these soils for most recreational uses is limited by wetness and flooding. The soils provide habitat for many animals. Ducks and other waterfowl use ponded areas. Deer and squirrels can find adequate food and cover. Many songbirds and the pileated woodpecker use areas of these soils for nesting.

The capability subclass is 4w. The Sardis soil is assigned the woodland ordination symbol 12W, and the Mathiston soil is assigned the woodland ordination symbol 10W.

SrA—Sawyer very fine sandy loam, 0 to 2 percent slopes. This nearly level soil is on low uplands. Individual areas are irregular in shape. The surface generally is plane but has a few low mounds. Individual areas range from 20 to 800 acres in size and average about 100 acres.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 8 inches, strongly acid, dark grayish brown very fine sandy loam that has few dark yellowish brown mottles

Subsurface layer:

8 to 13 inches, strongly acid, brown very fine sandy loam that has common yellowish brown mottles

Subsoil:

13 to 21 inches, very strongly acid, yellowish brown loam that has lenses of brown silt and very fine sand

21 to 26 inches, very strongly acid, yellowish brown

clay loam that has few light brownish gray and common yellowish brown mottles and has lenses of pale brown silt and very fine sand

26 to 31 inches, very strongly acid, mottled light brownish gray and yellowish brown clay loam

31 to 64 inches, very strongly acid, gray clay that has many dark red and reddish brown and common yellowish brown mottles

Substratum:

64 to 80 inches, very strongly acid, light brownish gray clay loam that has common dark red, reddish brown, and yellowish red mottles

Important soil properties—

Available water capacity: high
Permeability: slow
Drainage: moderately well drained
Runoff: slow
Water table: perched at a depth of 2 to 3 feet during some periods from December through April
Root zone: very deep
Shrink-swell potential: high in the lower part of the subsoil
Hazard of water erosion: slight (K factor—.37; T factor—a maximum allowance of 5 tons per acre per year)
Prime farmland: yes (all the soil properties meet the criteria)

Included with this soil in mapping are small areas of Bowie, Cuthbert, Guyton, luka, Kirvin, Metcalf, and Sacul soils. Bowie soils do not have gray mottles. They are in the higher landscape positions. Cuthbert soils have a clayey subsoil. They are on side slopes. Guyton soils are poorly drained. They are in slightly concave areas on terraces. luka soils are loamy throughout. They are on flood plains. Kirvin and Sacul soils have a clayey subsoil. They are in the slightly higher or lower areas where the loamy subsoil has eroded away. Metcalf soils have a loamy subsoil that is thicker than that of the Sawyer soil. They are in landscape positions similar to those of the Sawyer soil. Also included are some areas where the surface layer is loam or silt loam.

The contrasting Bowie, Cuthbert, Guyton, luka, and Kirvin soils make up less than 5 percent of the map unit. The other included soils are similar to the Sawyer soil and make up less than 10 percent of the map unit.

Areas of the Sawyer soil are used mainly as woodland or pasture.

The wooded areas support hardwoods and pine. The commercial trees used for timber production are loblolly pine, slash pine, and shortleaf pine. Yields of loblolly pine are 370 board feet per acre per year over a 50-year period. Based on a 50-year site curve, the mean site index for loblolly pine is 94.

Reforestation in cutover areas of loblolly pine and shortleaf pine occurs naturally where seed trees are in the stand. Reforestation also can be achieved by planting loblolly pine seedlings. When openings are made in the canopy, invading brush and hardwood species that are not controlled can delay the establishment or regeneration of pine. Selective thinning, removal of undesirable trees, and protection from wildfire increase yields.

No major problems affect timber production. Using standard equipment that has wheels or tracks causes rutting and compaction when the soil is moist and displacement of the surface layer when the soil is dry. Puddling can occur during wet periods, making unsurfaced roads and skid trails slick and almost impassable.

Using low-pressure ground equipment minimizes soil damage and erosion and helps to maintain productivity. The proper design and careful construction of haul roads and care in the selection of sites for culverts and turnouts help to control erosion. Skid trails, firebreaks, and other areas where the surface is disturbed are subject to rilling and gullying. Revegetating the spoil from excavations reduces the hazard of rill and gully erosion.

This soil is well suited to pasture grasses for grazing or hay. No major limitations affect these uses. Suitable pasture grasses include bahiagrass, bermudagrass, Dallisgrass, tall fescue, and weeping lovegrass. Low inherent soil fertility is a limitation. The relationship between plant growth and soil moisture is good. Applications of fertilizer and lime and controlled grazing improve yields and help to control erosion. Cool-season legumes, such as arrowleaf clover, white clover, singletary peas, and hairy vetch, provide winter forage and add nitrogen to the soil.

This soil is suitable for corn, grain sorghum, and truck crops, such as peas. Where the plant cover is inadequate, erosion is a hazard. Conservation tillage, terraces, and contour farming help to prevent excessive erosion. Crop growth may be limited by an insufficient amount of water during dry periods in summer. The soil is suited to several kinds of horticultural crops. Crop residue management is needed to maintain the content of organic matter and improve tilth. The soil can be tilled throughout a medium range in moisture content. Tillage is delayed by wetness during winter and early spring. Applications of lime and fertilizer improve yields.

Urban uses are affected by several soil factors. Because of the high shrink-swell potential in the subsoil, building foundations can crack. The slow permeability in the subsoil keeps septic tank absorption fields from operating satisfactorily. Low strength is a problem on sites for local roads and streets. Coating pipe and

treating concrete minimize corrosion. The soil generally is a good site for pond reservoir areas. The limitations affecting lawns are slight. Proper design and careful installation of structures can help to overcome or modify any hazards or limitations.

The suitability of this soil for most recreational uses is limited by the slow permeability in the subsoil and by wetness. The native vegetation provides good habitat for game birds, songbirds, small furbearers, and deer. Seed-producing grasses, forbs, shrubs, and nut-bearing trees provide ample food and shelter for most kinds of wildlife. Whitetail deer, bobwhite quail, mourning dove, and songbirds feed in the many open pastures and fields. They benefit from the security of the surrounding woodland cover.

The capability subclass is 2e. The woodland ordination symbol is 10A.

SvA—Scottsville very fine sandy loam, 0 to 2 percent slopes. This nearly level soil is on uplands that have a few low mounds. The surface is plane. Individual areas are irregular in shape. They range from 15 to 3,000 acres in size and average about 300 acres.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
- 0 to 4 inches, strongly acid, dark brown very fine sandy loam

Subsurface layer:
- 4 to 12 inches, strongly acid, yellowish brown very fine sandy loam that has common grayish brown mottles

Subsoil:
- 12 to 19 inches, strongly acid, yellowish brown loam that has few brown and common yellowish red mottles
- 19 to 30 inches, very strongly acid, yellowish brown loam that has common grayish brown, many yellowish red, and few red mottles and has lenses of brown silt and very fine sand
- 30 to 33 inches, very strongly acid, yellowish brown clay loam that has many red and light brownish gray mottles and has lenses of light brownish gray silt and very fine sand
- 33 to 60 inches, very strongly acid, light brownish gray clay that has many dark red and strong brown mottles

Substratum:
- 60 to 80 inches, very strongly acid, light gray clay that has many yellowish brown and common yellowish red mottles

Important soil properties—

Available water capacity: very high
Permeability: very slow
Drainage: moderately well drained
Runoff: slow
Water table: perched at a depth of 1 to 3 feet during some periods from late fall to spring
Root zone: very deep
Shrink-swell potential: high in the lower part of the subsoil
Hazard of water erosion: moderate (K factor—.43; T factor—a maximum allowance of 5 tons per acre per year)
Prime farmland: yes (all the soil properties meet the criteria

Included with this soil in mapping are small areas of Bernaldo, Eastwood, Elrose, luka, Latex, Metcalf, Meth, and Wolfpen soils. Bernaldo soils are loamy throughout the subsoil. They are in the slightly higher landscape positions. Eastwood soils have a clayey subsoil. They are on the higher convex ridgetops and the lower gently sloping to moderately steep side slopes. Elrose soils have a red subsoil. They are in gently sloping, convex areas on the higher ridgetops. luka soils are loamy throughout. They are on flood plains. Latex soils are in the slightly higher landscape positions. The loamy part of their subsoil is thicker than that of the Scottsville soil. Metcalf soils are somewhat poorly drained and are in concave areas. Meth soils have a clayey subsoil. They are on the higher convex ridgetops. Wolfpen soils have a sandy surface layer that is 20 to 40 inches thick. They are in gently sloping to moderately steep, convex areas on the higher parts of the landscape. Also included are areas where the surface layer is silt loam, loam, fine sandy loam, or very fine sandy loam.

The contrasting Eastwood, Elrose, luka, Meth, and Wolfpen soils make up less than 5 percent of the map unit. The other included soils are similar to the Scottsville soil and make up less than 20 percent of the map unit.

Areas of the Scottsville soil are used mainly as woodland or pasture. A few areas are used for nonirrigated crops or for homesite development.

The wooded areas support hardwoods and pine. The commercial trees used for timber production are loblolly pine, slash pine, and shortleaf pine. Yields of loblolly pine are 370 board feet per acre per year over a 50-year period. Based on a 50-year site curve, the mean site index is 100 for loblolly pine and 86 for shortleaf pine.

Reforestation in cutover areas of loblolly pine and shortleaf pine occurs naturally where seed trees are in the stand. Reforestation also can be achieved by

planting loblolly pine seedlings. When openings are made in the canopy, invading brush and hardwood species that are not controlled can delay the establishment or regeneration of pine. Selective thinning, removal of undesirable trees, and protection from wildfire increase yields.

Only a few problems affect timber production. Wetness is a limitation during late fall and early spring in some areas. Using standard equipment that has wheels or tracks causes rutting and compaction when the soil is moist and displacement of the surface layer when the soil is dry. Puddling can occur during wet periods, making unsurfaced roads and skid trails slick and almost impassable.

Using low-pressure ground equipment minimizes soil damage and erosion and helps to maintain productivity. The proper design and careful construction of haul roads and care in the selection of sites for culverts and turnouts help to control erosion. Skid trails, firebreaks, and other areas where the surface is disturbed are subject to rilling and gullying. Revegetating the spoil from excavations reduces the hazard of rill and gully erosion.

This soil is well suited to pasture grasses for grazing or hay. No major limitations affect these uses. Suitable pasture grasses include bahiagrass, bermudagrass, Dallisgrass, tall fescue, and weeping lovegrass. Low inherent soil fertility is a limitation. The relationship between plant growth and soil moisture is good. Applications of fertilizer and lime and controlled grazing improve yields and help to control erosion. Cool-season legumes, such as arrowleaf clover, white clover, singletary peas, and hairy vetch, provide winter forage and add nitrogen to the soil.

This soil is suitable for corn, grain sorghum, and truck crops, such as peas. Where the plant cover is inadequate, erosion is a hazard. Conservation tillage, terraces, and contour farming help to prevent excessive erosion. Crop growth may be limited by an insufficient amount of water during dry periods in summer. The soil is suited to several kinds of horticultural crops. Crop residue management is needed to maintain the content of organic matter and improve tilth. The soil can be tilled throughout a medium range in moisture content. Tillage is delayed by wetness during winter and early spring. Applications of lime and fertilizer improve yields.

Urban uses can be affected by several soil factors. Because of the high shrink-swell potential in the subsoil, building foundations can crack. Wetness and the very slow permeability in the subsoil keep septic tank absorption fields from operating satisfactorily. Low strength is a problem on sites for local roads and streets. Coating pipe and treating concrete minimize corrosion. The soil generally is a good site for pond reservoir areas. The limitations affecting lawns are slight. Proper design and careful installation of structures can help to overcome or modify any hazards or limitations.

The suitability of this soil for most recreational uses is limited by the very slow permeability in the subsoil. The native vegetation provides good habitat for game birds, songbirds, small furbearers, and deer. Seed-producing grasses, forbs, shrubs, and nut-bearing trees provide ample food and shelter for most kinds of wildlife. Whitetail deer, bobwhite quail, mourning dove, and songbirds feed in the many open pastures and fields. They benefit from the security of the surrounding woodland cover.

The capability subclass is 2w. The woodland ordination symbol is 11W.

Sz—Socagee silty clay loam, frequently flooded. This nearly level soil is on flood plains along large streams. The surface is plane or weakly concave. Individual areas range from 20 to 500 acres in size and average about 200 acres.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 7 inches, very strongly acid, gray silty clay loam that has dark yellowish brown mottles and has 4 percent soft, black masses

Subsoil:

7 to 21 inches, very strongly acid, gray silty clay loam that has dark yellowish brown and yellowish brown mottles and has 1 percent soft, black masses

21 to 40 inches, very strongly acid, light gray clay loam that has brownish yellow mottles and has 1 percent soft, black masses

40 to 60 inches, very strongly acid, grayish brown clay loam that has brownish yellow and strong brown mottles and has 1 percent black concretions

60 to 70 inches, very strongly acid, light brownish gray clay loam that has brownish yellow and yellowish brown mottles and has 1 percent soft, black masses

Substratum:

70 to 80 inches, very strongly acid, light brownish gray loam that has brownish yellow and strong brown mottles and has 1 percent soft, black masses

Important soil properties—

Available water capacity: high
Permeability: moderately slow
Drainage: poorly drained
Runoff: slow
Water table: within a depth of 1.5 feet during winter and spring and below a depth of 6.0 feet for most of the rest of the year
Flooding: frequent, occurring mostly from December through May and lasting from a few hours to several days
Root zone: very deep, but the root development of most plants is limited by the high water table
Shrink-swell potential: moderate
Hazard of water erosion: slight (K factor—.32; T factor—a maximum allowance of 5 tons per acre per year)
Prime farmland: no (because of a low pH, the wetness, and the frequent flooding)

Included with this soil in mapping are small areas of Bernaldo, Bibb, Bonn, Cart, Cypress, Eastwood, Estes, Guyton, Mathiston, and Sardis soils. Bernaldo soils have a loamy subsoil. They are on terraces. Bibb and Estes soils are in landscape positions similar to those of the Socagee soil. Bibb soils have less clay in the subsoil than the Socagee soil, and Estes soils have a clayey subsoil. Bonn soils have high concentrations of sodium salts in the subsoil. They are on low terraces. Cart soils are loamy in the upper part of subsoil and are brittle in the lower part of the subsoil. They are on mounded terraces. Cypress soils have a clayey subsoil. They are in the lower landscape positions and are submerged for most of the year. Eastwood soils have a clayey subsoil. They are on gently sloping to moderately steep side slopes. Guyton soils are characterized by an increase in content of clay in the subsoil. They are on mounded terraces. Mathiston and Sardis soils have brownish colors in the upper part of the subsoil. They are in landscape positions similar to those of the Socagee soil or are in the slightly higher areas on natural levees that border stream channels. Also included are some areas where the surface layer is silt loam to silty clay loam.

The contrasting Bernaldo, Bonn, Cart, and Eastwood soils make up less than 5 percent of the map unit. The other included soils are similar to the Socagee soil and make up less than 20 percent of the map unit.

Areas of the Socagee soil are used mainly as woodland. A few areas are used as pasture.

The wooded areas support hardwoods. Pine trees generally do not grow on this soil. The commercial trees used for timber production are willow oak and water oak. Yields of sweetgum are 207 board feet per acre per year over a 50-year period. Based on a 50-year site curve, the mean site index is 90 for sweetgum and 82 for willow oak and water oak.

Reforestation in cutover areas of willow and water oak occurs naturally where mast trees are in the stand. Reforestation also can be achieved by planting loblolly pine or oak seedlings. When openings are made in the canopy, invading brush and hardwood species that are not controlled can delay the establishment or regeneration of oak. Selective thinning, removal of undesirable trees, and protection from wildfire increase yields.

A few problems affect timber production. Seedling mortality may be significant because of flooding and the seasonal high water table. Root development may be restricted because of the seasonal high water table. Trees are occasionally subject to windthrow during periods when the soil is wet. Because of the seasonal high water table, the use of equipment may be restricted to midsummer, when the soil is dry. Using standard equipment that has wheels or tracks causes rutting and compaction when the soil is moist and displacement of the surface layer when the soil is dry. Puddling can occur during wet periods, making unsurfaced roads and skid trails slick and almost impassable.

Using low-pressure ground equipment minimizes soil damage and erosion and helps to maintain productivity. The proper design and careful construction of haul roads and care in the selection of sites for culverts and turnouts help to control erosion. Skid trails, firebreaks, and other areas where the surface is disturbed are subject to rilling and gullying. Revegetating the spoil from excavations reduces the hazard of rill and gully erosion.

Suitable pasture grasses include bahiagrass, Dallisgrass, and tall fescue. Low inherent soil fertility is a limitation. Wetness and flooding limit the use of some kinds of equipment, limit grass production, and restrict grazing during some periods in most years. Applications of fertilizer and lime, controlled grazing, and a surface drainage system improve yields and help to control erosion. Cool-season legumes, such as white clover and singletary peas, provide winter forage and add nitrogen to the soil.

This soil is not suitable for cropping because of flooding and wetness.

This soil is not suitable for urban uses. Wetness and flooding are severe limitations on sites for buildings, septic tank absorption fields, local roads and streets, and lawns. Overcoming these limitations generally is impractical. Low strength is a problem on sites for local roads and streets. Coating pipe and treating concrete minimize corrosion. Seepage may be a problem in pond reservoir areas, but proper design and careful

construction can help to overcome this limitation.

The suitability of this soil for most recreational uses is limited by wetness and flooding. The soil provides habitat for many animals. Ducks and other waterfowl use ponded areas. Deer and squirrels can find adequate food and cover. Many songbirds and the pileated woodpecker use areas of this soil for nesting.

The capability subclass is 5w. The woodland ordination symbol is 7W.

Ur—Urban land. This map unit consists of cut, filled, and graded areas covered by streets, parking lots, railroads, commercial buildings, factories, and other structures. In most of these areas, the upper part of the original soil was scraped away before construction. Less than 10 percent of the areas have any recognizable soil. Most of the soil material in these areas has been hauled in. The unit supports little or no vegetation. The plant cover will remain sparse without major reclamation. Slopes range from 0 to 3 percent. Areas range from 40 to 800 acres in size and average about 250 acres.

This unit is mainly in areas of the Wilcox and Reklaw Formations. Included soils are similar to the respective surrounding soils. Virtually all of the rainfall received in areas of this unit runs off the surface. It reaches the major drainageways quickly. Areas where the natural soil is exposed or where suitable fill material has been added are well suited to lawn grasses, trees, and shrubs.

No capability subclass or woodland ordination symbol is assigned.

WaE—Warnock loamy fine sand, 8 to 15 percent slopes. This strongly sloping and moderately steep soil is on side slopes in the uplands. The surface is plane or weakly convex. Individual areas range from 20 to 2,000 acres in size and average about 500 acres.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 3 inches, strongly acid, dark yellowish brown loamy fine sand

Subsurface layer:

3 to 19 inches, strongly acid, yellowish brown loamy fine sand

Subsoil:

19 to 31 inches, strongly acid, yellowish brown fine sandy loam that has common brownish yellow and strong brown mottles

31 to 43 inches, very strongly acid, yellowish brown sandy clay loam that has common red mottles

43 to 61 inches, very strongly acid, mottled brownish yellow and red sandy clay loam that has few light brownish gray mottles

61 to 80 inches, very strongly acid, mottled brownish yellow and red sandy clay loam that has few light brownish gray and dark yellowish brown mottles

Important soil properties—

Available water capacity: moderate
Permeability: moderate
Drainage: moderately well drained
Runoff: medium
Water table: at a depth of 4 to 6 feet from January through March
Root zone: very deep
Shrink-swell potential: low
Hazard of water erosion: moderate (K factor—.17; T factor—a maximum allowance of 5 tons per acre per year)
Prime farmland: no (because of the available water capacity, a low pH, and the slope)

Included with this soil in mapping are small areas of Bibb, Bowie, Cuthbert, Darco, Darden, Iuka, Kirvin, and Lilbert soils. Bibb and Iuka soils are loamy throughout. They are on bottom land and are subject to flooding. Bowie soils have a surface layer that is less than 20 inches thick. They are in the higher or lower gently sloping areas. Cuthbert soils have a clayey subsoil. They are in landscape positions similar to those of the Warnock soil. Darco soils have a surface layer that is 40 to 80 inches thick. They are in landscape positions similar to those of the Warnock soil or are on gently sloping convex ridgetops or in saddles. Darden soils are sandy throughout. They are in landscape positions similar to those of the Warnock soil or are in gently sloping areas. Kirvin soils have a clayey subsoil. They are in convex areas. Lilbert soils have a sandy surface layer that is 20 to 40 inches thick. They are in gently sloping areas. Also included are some areas where the sandy surface layer is more than 20 inches thick, a few areas where the subsoil is clayey, and some areas where cobbles and stones are along horizontally oriented outcrops.

The contrasting Bibb, Cuthbert, Darden, Iuka, and Kirvin soils make up less than 5 percent of the map unit. The other included soils are similar to the Warnock soil and make up less than 20 percent of the map unit.

Areas of the Warnock soil are used mainly as woodland. A few areas are used as pasture.

The wooded areas support hardwoods and pine. The commercial trees used for timber production are loblolly pine, slash pine, and shortleaf pine. Yields of loblolly pine are 340 board feet per acre per year over a 50-

year period. Based on a 50-year site curve, the mean site index is 91 for loblolly pine and 80 for shortleaf pine.

Reforestation in cutover areas of loblolly pine and shortleaf pine occurs naturally where seed trees are in the stand. Reforestation also can be achieved by planting loblolly pine seedlings. When openings are made in the canopy, invading brush and hardwood species that are not controlled can delay the establishment or regeneration of pine. Selective thinning, removal of undesirable trees, and protection from wildfire increase yields.

A few problems affect timber production. Seedling mortality may be significant because of droughtiness in this sandy soil. Larger or containerized nursery stock may be needed rather than the usual bare root stock. The loose, sandy surface layer hinders the use of wheeled equipment, especially when the soil is very dry. Using standard equipment that has wheels or tracks causes rutting and compaction when the soil is moist and displacement of the surface layer when the soil is dry. The slope can limit the use of equipment.

Because of the slope, excessive erosion can occur unless the soil is protected. Using low-pressure ground equipment minimizes soil damage and erosion and helps to maintain productivity. The proper design and careful construction of haul roads and care in the selection of sites for culverts and turnouts help to control erosion. Skid trails, firebreaks, and other areas where the surface is disturbed are subject to rilling and gullying. Revegetating the spoil from excavations reduces the hazard of rill and gully erosion.

Suitable pasture grasses include bahiagrass, bermudagrass, and weeping lovegrass. Low inherent soil fertility is a limitation. Although only low or moderate amounts of soil moisture are held in the profile, much of the moisture is readily available to plants. Obtaining a firm seedbed is difficult. Emerging grass seedlings can be killed by windblown sand unless cultural practices are applied. Applications of fertilizer and lime and controlled grazing improve yields and help to control erosion. Cool-season legumes, such as arrowleaf clover, crimson clover, and hairy vetch, provide winter forage and add nitrogen to the soil.

This soil is not suitable for cropping because of the slope and the susceptibility to erosion.

Urban uses can be affected by several soil factors. Extensive excavation and filling may be needed during construction because of the slope. Wetness, the restricted permeability in the subsoil, and the slope may keep septic tanks from operating satisfactorily. The slope hinders the construction of local roads and streets. Coating pipe and treating concrete minimize corrosion. Droughtiness and the slope may be limitations on sites for lawns. Seepage may be a problem in pond reservoir areas. Proper design and careful installation of structures can help to overcome or modify any hazards or limitations.

The suitability of this soil for most recreational uses is limited by the sandy surface layer and the slope. The native vegetation provides good habitat for game birds, songbirds, small furbearers, and deer. Seed-producing grasses, forbs, shrubs, and nut-bearing trees provide ample food and shelter for most kinds of wildlife. Whitetail deer, bobwhite quail, mourning dove, and songbirds feed in the many open pastures and fields. They benefit from the security of the surrounding woodland cover.

The capability subclass is 6e. The woodland ordination symbol is 9A.

WoC—Wolfpen loamy fine sand, 2 to 5 percent slopes. This gently sloping soil is on stream divides occurring as ridges in the uplands. The divides commonly separate small watersheds. Individual areas range from 15 to 500 acres in size and average about 70 acres.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 4 inches, medium acid, dark brown loamy fine sand

Subsurface layer:

4 to 9 inches, strongly acid, brown loamy fine sand

9 to 35 inches, strongly acid, very pale brown loamy fine sand that has common pale brown and light yellowish brown mottles

Subsoil:

35 to 44 inches, strongly acid, light yellowish brown sandy clay loam that has common brownish yellow and yellowish brown mottles and has few streaks of fine sand

44 to 50 inches, strongly acid, light yellowish brown fine sandy loam that has few yellowish brown and common brownish yellow mottles and has few streaks of fine sand

50 to 66 inches, strongly acid, brownish yellow fine sandy loam that has few yellowish brown and strong brown mottles and has common streaks of fine sand

66 to 80 inches, strongly acid, mottled light gray, pale brown, and reddish yellow fine sandy loam that has common brownish yellow mottles

Important soil properties—

Available water capacity: moderate

Permeability: moderate
Drainage: well drained
Runoff: slow
Water table: at a depth of 4 to 6 feet during winter and spring and below a depth of 6 feet during the rest of the year
Root zone: very deep
Shrink-swell potential: low
Hazard of water erosion: slight (K factor—.17; T factor—a maximum allowance of 5 tons per acre per year)
Prime farmland: no (because of the available water capacity)

Included with this soil in mapping are small areas of Bernaldo, Cuthbert, Darbonne, Darden, Elrose, Iuka, Kirvin, Latex, Meth, and Pickton soils. Bernaldo and Darbonne soils have a surface layer that is less than 20 inches thick. They are in broad, gently sloping areas. Iuka soils are on bottom land and are subject to flooding. Cuthbert soils have a clayey subsoil. They are on moderately sloping to moderately steep side slopes. Darden soils are sandy throughout. They are in landscape positions similar to those of the Wolfpen soil or are on moderately sloping to moderately steep side slopes. Elrose soils have a red subsoil. They are on the higher ridges. Kirvin soils have a clayey subsoil. They are on convex ridgetops and in gently sloping areas. Latex soils are in the lower landscape positions. Their subsoil is loamy in the upper part and clayey in the lower part. Meth soils have a clayey subsoil. They are in the lower convex areas. Pickton soils have a surface layer that is 40 to 80 inches thick. They are in landscape positions similar to those of the Wolfpen soil or are on moderately sloping to moderately steep side slopes. Also included are some areas where the surface layer is less than 20 inches thick.

The contrasting Cuthbert, Darden, Elrose, Iuka, Kirvin, Latex, and Meth soils make up less than 5 percent of the map unit. The other included soils are similar to the Wolfpen soil and make up less than 15 percent of the map unit.

Areas of the Wolfpen soil are used mainly as woodland. A few areas are used as pasture.

The wooded areas support hardwoods and pine. The commercial trees used for timber production are loblolly pine, slash pine, and shortleaf pine. Yields of loblolly pine are 330 board feet per acre per year over a 50-year period. Based on a 50-year site curve, the mean site index is 90 for loblolly pine and 82 for shortleaf pine.

Reforestation in cutover areas of loblolly pine and shortleaf pine occurs naturally where seed trees are in the stand. Reforestation also can be achieved by planting loblolly pine seedlings. When openings are made in the canopy, invading brush and hardwood species that are not controlled can delay the establishment or regeneration of pine. Selective thinning, removal of undesirable trees, and protection from wildfire increase yields.

A few problems affect timber production. Seedling mortality may be significant because of droughtiness in this sandy soil. Larger or containerized nursery stock may be needed rather than the usual bare root stock. The loose, sandy surface layer hinders the use of wheeled equipment, especially when the soil is very dry. Using standard equipment that has wheels or tracks causes rutting and compaction when the soil is moist and displacement of the surface layer when the soil is dry.

Using low-pressure ground equipment minimizes soil damage and erosion and helps to maintain productivity. The proper design and careful construction of haul roads and care in the selection of sites for culverts and turnouts help to control erosion. Skid trails, firebreaks, and other areas where the surface is disturbed are subject to rilling and gullying. Revegetating the spoil from excavations reduces the hazard of rill and gully erosion.

Suitable pasture grasses include bahiagrass, bermudagrass, and weeping lovegrass. Low inherent soil fertility is a limitation. Although only low or moderate amounts of soil moisture are held in the profile, much of the moisture is readily available to plants. Obtaining a firm seedbed is difficult. Emerging grass seedlings can be killed by windblown sand unless cultural practices are applied. Applications of fertilizer and lime and controlled grazing improve yields and help to control erosion. Cool-season legumes, such as arrowleaf clover, crimson clover, and hairy vetch, provide winter forage and add nitrogen to the soil.

This soil is suitable for peas, corn, and watermelons. Where the plant cover is inadequate or the slope exceeds 3 percent, erosion is a hazard. Conservation tillage, terraces, and contour farming help to prevent excessive erosion. Crop growth may be limited by a lack of water during dry periods because of the low available water capacity in the upper part of the soil. The soil is suited to several kinds of horticultural crops. Crop residue management is needed to maintain the content of organic matter and improve tilth. The soil can be tilled throughout a wide range in moisture content. Applications of lime and fertilizer improve yields.

Urban uses can be affected by several soil factors. The rapid permeability in the topsoil keeps septic tank absorption fields from operating satisfactorily. Coating pipe and treating concrete minimize corrosion. Droughtiness may be a limitation on sites for lawns.

Seepage may be a problem in pond reservoir areas. The limitations that affect buildings and local roads and streets are slight. Proper design and careful installation of structures can help to overcome or modify any hazards or limitations.

The suitability of this soil for most recreational uses is limited by the sandy surface layer. The native vegetation provides good habitat for game birds, songbirds, small furbearers, and deer. Seed-producing grasses, forbs, shrubs, and nut-bearing trees provide ample food and shelter for most kinds of wildlife. Whitetail deer, bobwhite quail, mourning dove, and songbirds feed in the many open pastures and fields. They benefit from the security of the surrounding woodland cover.

The capability subclass is 3s. The woodland ordination symbol is 9S.

WoE—Wolfpen loamy fine sand, 8 to 15 percent slopes. This strongly sloping and moderately steep soil is on side slopes in the uplands. Individual areas range from 15 to 2,000 acres in size and average about 300 acres.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 4 inches, very strongly acid, brown loamy fine sand

Subsurface layer:

4 to 30 inches, strongly acid, very pale brown loamy fine sand that has few light yellowish brown, common brownish yellow, and few reddish yellow mottles

Subsoil:

30 to 45 inches, very strongly acid, brownish yellow sandy clay loam that has few red and common yellowish red mottles

45 to 61 inches, very strongly acid, brownish yellow sandy clay loam that has few light brownish gray and yellowish red and common red mottles

Substratum:

61 to 70 inches, very strongly acid, mottled light brownish gray and brownish yellow sandy clay loam that has few red and strong brown and common light red mottles

70 to 80 inches, very strongly acid, light brownish gray, mottled sandy clay loam

Important soil properties—

Available water capacity: moderate
Permeability: moderate
Drainage: well drained
Runoff: slow
Water table: at a depth of 4 to 6 feet during winter and spring and below a depth of 6 feet during the rest of the year
Root zone: very deep
Shrink-swell potential: low
Hazard of water erosion: moderate (K factor—.17; T factor—a maximum allowance of 5 tons per acre per year)
Prime farmland: no (because of the available water capacity and the slope)

Included with this soil in mapping are small areas of Bernaldo, Bibb, Cuthbert, Darden, Eastwood, Iuka, Kirvin, and Pickton soils. Bernaldo soils have a surface layer that is less than 20 inches thick. They are on gently sloping toe slopes. Bibb and Iuka soils are on bottom land and are subject to flooding. Cuthbert and Eastwood soils have a clayey subsoil. They are in landscape positions similar to those of the Wolfpen soil or are in convex areas. Darden and Pickton soils are in landscape positions similar to those of the Wolfpen soil. Darden soils are sandy throughout, and Pickton soils have a surface layer that is 40 to 80 inches thick. Kirvin soils have a clayey subsoil. They are on the higher convex ridgetops. Also included are some areas where the surface layer is less than 20 inches thick.

The contrasting Bernaldo, Bibb, Cuthbert, Darden, Eastwood, Iuka, and Kirvin soils make up less than 10 percent of the map unit. The other included soils are similar to the Wolfpen soil and make up less than 10 percent of the map unit.

Areas of the Wolfpen soil are used mainly as woodland. A few areas are used as pasture.

The wooded areas support hardwoods and pine. The commercial trees used for timber production are loblolly pine, slash pine, and shortleaf pine. Yields of loblolly pine are 330 board feet per acre per year over a 50-year period. Based on a 50-year site curve, the mean site index is 90 for loblolly pine and 82 for shortleaf pine.

Reforestation in cutover areas of loblolly pine and shortleaf pine occurs naturally where seed trees are in the stand. Reforestation also can be achieved by planting loblolly pine seedlings. When openings are made in the canopy, invading brush and hardwood species that are not controlled can delay the establishment or regeneration of pine. Selective thinning, removal of undesirable trees, and protection from wildfire increase yields.

A few problems affect timber production. Seedling mortality may be significant because of droughtiness in this sandy soil. Larger or containerized nursery stock

may be needed rather than the usual bare root stock. The loose, sandy surface layer hinders the use of wheeled equipment, especially when the soil is very dry. Using standard equipment that has wheels or tracks causes rutting and compaction when the soil is moist and displacement of the surface layer when the soil is dry. The slope limits the use of equipment.

Because of the slope, excessive erosion can occur unless the soil is protected. Using low-pressure ground equipment minimizes soil damage and erosion and helps to maintain productivity. The proper design and careful construction of haul roads and care in the selection of sites for culverts and turnouts help to control erosion. Skid trails, firebreaks, and other areas where the surface is disturbed are subject to rilling and gullying. Revegetating the spoil from excavations reduces the hazard of rill and gully erosion.

Suitable pasture grasses include bahiagrass, bermudagrass, and weeping lovegrass. Low inherent soil fertility is a limitation. Although only low or moderate amounts of soil moisture are held in the profile, much of the moisture is readily available to plants. Obtaining a firm seedbed is difficult. Emerging grass seedlings can be killed by windblown sand unless cultural practices are applied. Applications of fertilizer and lime and controlled grazing improve yields and help to control erosion. Cool-season legumes, such as arrowleaf clover, crimson clover, and hairy vetch, provide winter forage and add nitrogen to the soil.

This soil is not suitable for cropping. It is susceptible to excessive erosion because of the slope, and it has a low available water capacity in the upper part. It generally is not suited to horticultural crops. If these crops were grown, special management and careful plant selection would be required. Crop residue management is needed to maintain the content of organic matter and improve tilth. The soil can be tilled throughout a wide range in moisture content. Applications of lime and fertilizer improve yields.

Urban uses may be affected by several soil factors. Extensive excavation and filling may be needed during construction because of the slope. The rapid permeability in the topsoil keeps septic tank absorption fields from operating satisfactorily. The slope hinders the construction of local roads and streets. Coating pipe and treating concrete minimize corrosion. Droughtiness and the slope may be limitations on sites for lawns. Seepage may be a problem in pond reservoir areas. Proper design and careful installation of structures can help to overcome or modify any hazards or limitations.

The suitability of this soil for most recreational uses is limited by the sandy surface layer and the slope. The native vegetation provides good habitat for game birds, songbirds, small furbearers, and deer. Seed-producing grasses, forbs, shrubs, and nut-bearing trees provide ample food and shelter for most kinds of wildlife. Whitetail deer, bobwhite quail, mourning dove, and songbirds feed in the many open pastures and fields. They benefit from the security of the surrounding woodland cover.

The capability subclass is 6e. The woodland ordination symbol is 9S.

Prime Farmland

In this section, prime farmland is defined and the soils in Harrison County that are considered prime farmland are listed.

Prime farmland is one of several kinds of important farmland defined by the U.S. Department of Agriculture. It is of major importance in meeting the Nation's short- and long-range needs for food and fiber. The acreage of high-quality farmland is limited, and the U.S. Department of Agriculture recognizes that government at local, State, and Federal levels, as well as individuals, must encourage and facilitate the wise use of our Nation's prime farmland.

Prime farmland soils, as defined by the U.S. Department of Agriculture, are soils that are best suited to food, feed, forage, fiber, and oilseed crops. Such soils have properties that favor the economic production of sustained high yields of crops. The soils need only to be treated and managed by acceptable farming methods. The moisture supply must be adequate, and the growing season must be sufficiently long. Prime farmland soils produce the highest yields with minimal expenditure of energy and economic resources. Farming these soils results in the least damage to the environment.

Prime farmland soils may presently be used as cropland, pasture, or woodland or for other purposes. They either are used for food or fiber or are available for these uses. Urban or built-up land, public land, and water areas cannot be considered prime farmland. Urban or built-up land is any contiguous unit of land 10 acres or more in size that is used for such purposes as housing, industrial, and commercial sites, sites for institutions or public buildings, small parks, golf courses, cemeteries, railroad yards, airports, sanitary landfills, sewage treatment plants, and water-control structures. Public land is land not available for farming in National forests, National parks, military reservations, and State parks.

Prime farmland soils usually receive an adequate and dependable supply of moisture from precipitation or irrigation. The temperature and growing season are favorable. The acidity or alkalinity level of the soils is acceptable. The soils have few or no rocks and are permeable to water and air. They are not excessively erodible or saturated with water for long periods and are not frequently flooded during the growing season. The slope ranges mainly from 0 to 5 percent.

The soils in Harrison County that do not meet the criteria for prime farmland are characterized by one or more of the following—an available water capacity of less than 4 inches in the upper 40 inches, a slope of more than 5 percent, a pH of less than 4 in the upper 40 inches, permeability of less than 0.06 inches per hour in the upper 20 inches, a natric horizon, wetness, frequent flooding, and a hazard of water erosion. Pirkey and Marlake soils, which are in reclaimed areas that formerly were mined for lignite, meet the criteria for prime farmland, but their sustained production potential has not been determined.

The following map units are considered prime farmland in Harrison County. The location of each map unit is shown on the detailed soil maps at the back of this publication. The extent of each unit is given in table 4. The soil qualities that affect use and management are described in the section "Detailed Soil Map Units." This list does not constitute a recommendation for a particular land use.

The soils identified as prime farmland in Harrison County are:

BaB	Bernaldo fine sandy loam, 1 to 3 percent slopes
BoC	Bowie very fine sandy loam, 2 to 5 percent slopes
EbB	Elrose fine sandy loam, 1 to 3 percent slopes
EcA	Erno-Cart complex, 0 to 2 percent slopes
LeB	Latex fine sandy loam, 1 to 3 percent slopes
McA	Metcalf-Cart complex, 0 to 2 percent slopes
MeB	Meth fine sandy loam, 1 to 3 percent slopes
SrA	Sawyer very fine sandy loam, 0 to 2 percent slopes
SvA	Scottsville very fine sandy loam, 0 to 2 percent slopes

Use and Management of the Soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help to prevent soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavioral characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis for predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; as woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreational facilities; and for wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern that is in harmony with nature.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

Crops and Pasture

Claude Compton, agronomist, Soil Conservation Service, helped prepare this section.

General management needed for crops and pasture is suggested in this section. The crops or pasture plants best suited to the soils, including some not commonly grown in the survey area, are identified; the system of land capability classification used by the Soil Conservation Service is explained; and the estimated yields of the main crops and hay and pasture plants are listed for each soil.

Planners of management systems for individual fields or farms should consider the detailed information given in the description of each soil under the heading "Detailed Soil Map Units." Specific information can be obtained from the local office of the Soil Conservation Service or the Texas Agricultural Extension Service.

Cropland

Cropland is of minor extent and importance in Harrison County. Home gardens, truck crops, and crops used for livestock feed are commonly grown. The crops include corn, tomatoes, watermelons, and annual forage crops for livestock.

The major management measures on the soils used as cropland in the county are those that control water erosion, maintain tilth and fertility, and drain off excess water. These measures are defined in the following paragraphs.

Crop residue management or conservation tillage.—Leaving crop residue on the surface helps to control water erosion and conserve moisture. Incorporating residue into the soil improves tilth and the available water capacity.

Contour farming and terraces.—Terracing and farming on the contour help to control water erosion. They are effective on most soils that have a slope of more than 1 percent.

Conservation cropping sequence.—Planting selected crops in a planned sequence helps to provide adequate organic residue for maintenance or improvement of soil tilth, reduces the hazard of erosion, improves the efficiency of water use and the quality of water, and breaks reproduction cycles of plant pests.

Cover crops.—Cover crops protect the surface after the crop has been harvested and before the next cultivated crop is planted. Examples of the cover crops that are best suited to the soils in the survey area are

small grain, vetch, and mixtures of annual grasses and legumes.

Nutrient management.—Timely applications of the proper kinds and amounts of plant nutrients and lime help to achieve optimum crop yields and minimize the entry of nutrients into surface and ground water.

Control of insects, weeds, and disease.—Controlling insects, weeds, and disease helps to maintain plant growth, crop production, and environmental resources.

Pasture

Improved pastures and meadows are the main sources of forage for livestock in Harrison County. Improved or tame pastures include improved varieties of grasses and legumes established to obtain higher forage yields. Most of the tame pastures in the county are in areas of old cropland that have been converted to grasses. The major grasses grown on the improved pastures are common bermudagrass, improved bermudagrasses, and bahiagrass. The improved bermudagrasses are dominantly coastal and Alicia varieties. Other grasses are Pensacola bahiagrass and Kentucky fescue. Crimson clover, Louisiana S-1 white clover, arrowleaf clover, hairy vetch, and singletary peas are the more important legumes overseeded in areas of perennial grasses. Weeping lovegrass is grown on some of the droughty, sandy soils.

All of the soils in the county require applications of fertilizer for high yields of good-quality forage. Lime also is needed on most of the soils.

Selecting the species and varieties of grasses and legumes that are best suited to the soils helps to achieve higher yields. Weed and brush control, applications of lime and fertilizer, proper grazing management, proper hayland management, and livestock water management are needed. The proper mixture of these management practices can help to achieve good yields even on poorly suited soils. Yields may increase as new varieties and new production technology are developed, but the productivity of a given soil compared with that of other soils is not likely to change.

Yields per Acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 5. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors. The land capability classification of each map unit also is shown in the table.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents. Available yield data from nearby counties and results of field trials and demonstrations are also considered.

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, barnyard manure, and green manure crops; and harvesting that ensures the smallest possible loss.

The estimated yields reflect the productive capacity of each soil for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in table 5 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Soil Conservation Service or of the Texas Agricultural Extension Service can provide information about the management and productivity of the soils for those crops.

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for use as cropland *(11)*. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The criteria used in grouping the soils do not include major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for rangeland, for woodland, and for engineering purposes.

In the capability system, soils are generally grouped at three levels—capability class, subclass, and unit. Only class and subclass are used in this survey.

Capability classes, the broadest groups, are designated by numbers 1 through 8. The numbers indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class 1 soils have few limitations that restrict their use.

Class 2 soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class 3 soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

Class 4 soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

Class 5 soils are not likely to erode, but they have other limitations, impractical to remove, that limit their use.

Class 6 soils have severe limitations that make them generally unsuitable for cultivation.

Class 7 soils have very severe limitations that make them unsuitable for cultivation.

Class 8 soils and miscellaneous areas have limitations that nearly preclude their use for commercial crop production.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e, w, s,* or *c,* to the class numeral, for example, 2e. The letter *e* shows that the main hazard is the risk of erosion unless a close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c,* used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

There are no subclasses in class 1 because the soils of this class have few limitations. The soils in class 5 are subject to little or no erosion, but they have other limitations that restrict their use to pasture, rangeland, woodland, wildlife habitat, or recreation. Class 5 contains only the subclasses indicated by *w, s,* or *c.*

The capability classification of each map unit is given in the section "Detailed Soil Map Units" and in table 5.

Woodland Management and Productivity

John Patterson, forester, Soil Conservation Service, helped prepare this section.

Harrison County has about 299,256 acres of woodland. The woodland is used not only for commercial wood products but also for hunting and other recreational activities. Large industrial landowners manage about 15,000 acres of the woodland, and the Department of Army manages 8,000 acres around Longhorn Army Ammunition Plant. The remaining 276,256 acres of woodland is managed by individual landowners.

The soils and climate in Harrison County are well suited to the production of timber. Lumber, pulpwood, and wood products that are manufactured in the county are major sources of income. The county has several pulpwood yards (fig. 9) and small lumber mills and one large mill, which is north of the city of Marshall. Control of undesirable species is the major management problem. Production could be greatly increased by better management of the privately owned woodland.

Wooded areas in the uplands mainly support mixed pine and hardwoods. The dominant species are loblolly pine, shortleaf pine, red oak, hickory, and sweetgum. Wooded areas on bottom land support mainly water oak, willow oak, overcup oak, and sweetgum. Baldcypress grows in the basin of the Cypress River.

Soils vary in their ability to produce trees. Fertility and texture influence tree growth. Permeability, drainage, and position on the landscape also are important.

This soil survey can be used by woodland managers planning ways to increase the productivity of forest land. Some soils respond better to applications of fertilizer than others, and some are more susceptible to erosion after roads are built and timber is harvested. Some soils require special reforestation efforts. In the section "Detailed Soil Map Units," the description of each map unit in the survey area suitable for timber includes information about productivity, limitations in harvesting timber, and management concerns in producing timber. Table 6 summarizes this forestry information and rates the soils for a number of factors to be considered in management. *Slight, moderate,* and *severe* are used to indicate the degree of the major soil limitations to be considered in forest management.

Table 6 lists the *ordination symbol* for each soil. The first part of the ordination symbol, a number, indicates the potential productivity of a soil for the indicator species based on site index. The larger the number, the greater the potential productivity.

Loblolly pine is the indicator species for soils that can be used for pine. For soils having a very high potential productivity (site indices of 92 or more), the first part of the ordination symbol is 10 or more. For soils having a low potential productivity (site indices of 70 or less), the first part of the ordination symbol is 6 or less.

Sweetgum is the indicator species for soils that normally can be used only for hardwoods. For soils having a very high potential productivity (site indices of 91 or more), the first part of the ordination symbol is 8 or more. For soils having a low potential productivity (site indices of less than 80), the first part of the ordination symbol is 5 or less.

The second part of the ordination symbol, a letter, indicates the major kind of soil limitation affecting use

Figure 9.—A typical pulpwood yard in Harrison County.

and management. The letter *R* indicates a soil that has a significant limitation because of steepness of slope. The letter *X* indicates that a soil has restrictions because of stones or rocks on the surface. The letter *W* indicates a soil in which excessive water, either seasonal or year-round, causes a significant limitation. The letter *T* indicates a soil that has, within the root zone, excessive alkalinity or acidity, sodium salts, or other toxic substances that limit the development of desirable trees. The letter *D* indicates a soil that has a limitation because of a restricted rooting depth, such as a shallow soil that is underlain by hard bedrock, a hardpan, or other layers that restrict roots. The letter *C* indicates a soil that has a limitation because of the kind or amount of clay in the upper part of the profile. The letter *S* indicates a dry, sandy soil. The letter *F* indicates a soil that has a large amount of coarse fragments. The letter *A* indicates a soil having no significant limitations that affect forest use and management. If a soil has more than one limitation, the priority is as follows: R, X, W, T, D, C, S, and F.

Ratings of the *erosion hazard* indicate the probability

that damage may occur if site preparation or harvesting activities expose the soil. The risk is *slight* if no particular preventive measures are needed under ordinary conditions; *moderate* if erosion-control measures are needed for particular silvicultural activities; and *severe* if special precautions are needed to control erosion for most silvicultural activities. Ratings of moderate or severe indicate the need for construction of higher standard roads, additional maintenance of roads, additional care in planning harvesting and reforestation activities, or the use of special equipment.

Ratings of *equipment limitation* indicate limits on the use of forest management equipment, year-round or seasonal, because of such soil characteristics as slope, wetness, and texture of the surface layer. As slope gradient and length increase, it becomes more difficult to use wheeled equipment. On the steeper slopes, tracked equipment may be needed. The rating is *slight* if equipment use is restricted by wetness for less than 2 months and if special equipment is not needed. The rating is *moderate* if slopes are so steep (15 to 25 percent) that wheeled equipment may not be operated safely across the slope, if wetness restricts equipment use from 2 to 4 months per year, if a sandy or clayey surface layer restricts the use of ground-based equipment, or if special equipment is needed to prevent or minimize compaction. The rating is *severe* if slopes are so steep (more than 25 percent) that wheeled equipment cannot be operated safely across the slope, if wetness restricts equipment use for more than 4 months per year, if the surface layer is loose sand that severely restricts the use of ground-based equipment, or if special equipment is needed to prevent or minimize compaction. Ratings of moderate or severe indicate a need to choose the best suited equipment and to carefully plan the timing of harvesting and other management activities.

Ratings of *seedling mortality* refer to the probability of the death of naturally occurring or properly planted seedlings of good stock in periods of normal rainfall, as influenced by kinds of soil or topographic features. Seedling mortality is caused primarily by too much water or too little water. The factors used in rating a soil for seedling mortality are texture of the surface layer, depth to a seasonal high water table and the length of the period when the water table is high, rock fragments in the surface layer, and rooting depth. The mortality rate generally is highest on soils that have a sandy or clayey surface layer. The risk is *slight* if, after site preparation, expected mortality is less than 25 percent; *moderate* if expected mortality is between 25 and 50 percent; and *severe* if expected mortality exceeds 50 percent. Ratings of moderate or severe indicate that it may be necessary to increase the number of trees planted per acre or to make special site preparations, such as bedding, furrowing, installing a surface drainage system, and providing artificial shade for seedlings. Reinforcement planting is often needed if the risk is moderate or severe.

Ratings of *windthrow hazard* indicate the likelihood that trees will be uprooted by the wind. A restricted rooting depth is the main reason for windthrow (fig. 10). The rooting depth can be restricted by a high water table, a fragipan, or bedrock or by a combination of such factors as soil wetness, texture, structure, and depth. The risk is *slight* if strong winds cause trees to break but do not uproot them; *moderate* if strong winds cause an occasional tree to be blown over and many trees to break; and *severe* if the rooting depth is less than 20 inches. A severe rating indicates that care is needed in thinning or that the stand should not be thinned at all. Special equipment may be needed to prevent damage to shallow root systems in partial cutting operations. A plan for the periodic removal of windthrown trees and the maintenance of a road and trail system may be needed.

Ratings of *plant competition* indicate the likelihood of the growth or invasion of undesirable plants. Plant competition is more severe on the more productive soils, on poorly drained soils, and on soils having a restricted root zone that holds moisture. The risk is *slight* if competition from undesirable plants hinders adequate natural or artificial reforestation but does not necessitate intensive site preparation and maintenance. The risk is *moderate* if competition from undesirable plants hinders natural or artificial reforestation to the extent that intensive site preparation and maintenance are needed. The risk is *severe* if competition from undesirable plants prevents adequate natural or artificial reforestation unless the site is intensively prepared and maintained. A moderate or severe rating indicates the need for site preparation to control plant competition and ensure the development of an adequately stocked stand. Managers must plan site preparation measures to ensure reforestation without delays.

The *potential productivity* of *common trees* on a soil is expressed as a *site index* and a *volume* number. Common trees that have commercial value are listed in the order of their observed general occurrence. Generally, only two or three tree species dominate. The first tree listed for each soil is the indicator species for that soil. An indicator species is a tree that is common in the area and that is generally the most productive on a given soil. The productivity of the soils in this survey generally is based on loblolly pine for all sites suited to

Figure 10.—A windthrown tree in an area of Bibb silt loam, frequently flooded. The seasonal high water table in this soil limits the rooting depth.

pine and sweetgum for areas on bottom land suitable only for hardwoods.

The *site index* is determined by taking height measurements and determining the age of selected dominant and codominant trees within stands of a given species. This index is the average height, in feet, that the trees attain in 50 years. This index applies to fully stocked, even-aged, unmanaged stands. Site index values shown in table 6 are based on published site index tables *(5, 6, 8, 13)*.

The *volume* is the yield likely to be produced by the most important trees, expressed in board feet (Doyle rule) per acre per year. These annual yield figures apply to fully stocked natural stands. The stands do not have a history of any intermediate cutting management. Therefore, applying sound forestry practices, such as scheduled thinnings, will significantly increase the listed yields.

Trees to plant are those that are used for reforestation or, under suitable conditions, natural regeneration. They are suited to the soils and can produce a commercial wood crop. The desired product, topographic position (such as a low, wet area), and personal preference are three factors among many that can influence the choice of trees for use in reforestation.

Woodland Understory Vegetation

John Patterson, forester, and Claude Compton, agronomist, Soil Conservation Service, helped prepare this section.

Understory vegetation consists of grasses, forbs, shrubs, and other plants. If well managed, woodland can produce enough understory vegetation to support grazing of livestock or wildlife, or both, without damage to the trees.

Livestock farming is a major agricultural enterprise in Harrison County. In 1987, the county had about 13,000 cattle *(9)*. Cow-calf enterprises are dominant. Most of the forage is supplied by improved pastures, but many farmers have wooded areas that are grazed. More than 120,000 acres of forest land is grazed in the county.

Forage production is highest after an area is clearcut. Herbage yields average about 1,500 pounds (air-dry weight) per acre annually. On choice sites the yield can exceed 3,000 pounds. On grazed woodland that is periodically burned, grasses make up at least 80 percent of the vegetation. Sedges, forbs, and shrubs make up the rest.

The density of the canopy determines the amount of light that reaches the understory plants. The canopy cover is the major factor affecting the production of vegetation within reach of livestock and large game animals. Good silvicultural practices, such as thinning of timber stands, removal of cull trees, and controlled burning, along with livestock management are necessary to maintain moderate or good production of understory vegetation. Unless these practices are used, the extent of the canopy cover increases significantly because of the growth of shrubs and hardwoods in the midstory. A site that has a closed canopy of 75 percent or more may not have sufficient carrying capacity for a profitable livestock enterprise. Also, use of the site by big game animals will be limited because sufficient browse plants are not available.

In 1983, hunting leases were worth about eight times the value of grazing leases on a per acre basis. Livestock management is necessary to minimize reduction of the carrying capacity for deer. In many areas landowners are removing livestock from their woodland in favor of deer herds.

The quantity and quality of understory vegetation vary, depending on the kind of soil, the age and kind of trees in the canopy, and the depth of the litter on the forest floor.

Table 7 lists the major plants (grasses, forbs, and shrubs) that may be evident under the canopy density that represents the highest wood production for the forest crop of the particular woodland ordination group. The understory vegetation includes the herbaceous plants and the leaves, twigs, and fruit of woody plants that have a height of as much as 4.5 feet. The annual production is expressed in pounds per acre of air-dry vegetation expected in favorable, normal, and unfavorable years. In a favorable year, soil moisture is above average during the growing season; in a normal year, it is average; and in an unfavorable year, it is below average.

Table 7 also lists the common names of the characteristic vegetation and the *composition,* by percentage of air-dry weight, of each plant. The table shows the kind and percentage of understory plants that may occur in the climax plant community where burning has occurred every 3 or 4 years and where the canopy is 35 to 55 percent pine. The understory plant community on most of the soils is dominated by pinehill bluestem. Other plants make up the rest of the plant community in about the percentages shown in the table.

In addition to proper woodland management, the following practices can help to achieve high levels of forage production consistent with good forest management.

Proper woodland grazing or proper grazing use is grazing at an intensity that maintains or improves the quantity and quality of desirable plants. It is generally thought to be grazing of no more than half, by weight, of the annual growth of the key forage plants in preferred grazing areas. Proper grazing use increases the vigor and reproduction capacity of the key forage plants, conserves soil and water, improves the condition of the vegetation, increases forage production, and reduces the hazard of wildfire.

Deferred grazing consists of postponing grazing or resting grazing land for a prescribed period. The rest period promotes the growth of natural vegetation by permitting the vigor of the forage to increase and by permitting desirable plants to seed. Deferred grazing provides feed reserves for fall and winter and reduces the hazard of erosion.

Planned grazing systems are systems in which two or more grazing units are rested in a planned sequence throughout the year or during the growing season of the key forage plants. These systems improve the production of desirable forage plants and trees.

Prescribed burning can control undesirable vegetation, increase forage production through the removal of part of the duff, and reduce the hazard of wildfire.

Gardening and Landscaping

M.L. "Marty" Baker, extension horticulturist, Texas Agricultural Extension Service, helped prepare this section.

Knowledge of soils is important in selecting plants for gardening and landscaping. Suitable plants will

thrive *(4)*. Costly plant replacements or expensive soil additives will not be necessary. Homeowners who want to do their own landscaping need to know the type of soil on the site and the kinds of vines, shrubs, trees, and grasses that are best suited to that soil. In some areas plants may be needed for erosion control as well as for esthetic and environmental purposes and for food.

The soils that are well suited to yard and garden plants and fruit- and nut-bearing trees are characterized by a deep root zone, a loamy texture, a balanced supply of plant nutrients, a high content of organic matter in various stages of decomposition, an adequate available water capacity, good drainage, and granular structure that allows the free movement of water and air and root development. A degree of acidity or alkalinity that is suitable for the plant to be grown also is important. For example, roses and most annual flowers, vegetables, and grasses generally grow best on soils that are neutral or slightly acid. Azaleas, camellias, and similar plants require soils that are very strongly acid. Many of the plants grown in Harrison County are well suited to soils that are very strongly acid to medium acid.

Some of the flowers, vines, shrubs, trees, perennials, ornamental grasses, lawn grasses, and plants used for ground cover are listed in tables 8, 9, and 10. Some of these plants are native to Harrison County. The more commonly grown flowers, ground cover plants, vines, shrubs, trees, perennials, and lawn grasses that are suited to each soil are listed in the tables. Reaction, texture, drainage, available water capacity, permeability, structure, and other soil characteristics are given in the sections "Detailed Soil Map Units" and "Soil Series and Their Morphology."

Conditioning the native soil is generally preferable and more economical than replacing it with other soil material. The soil should be tested, and the fertility needs of the plants to be grown should be determined. Organic matter is the most important soil amendment. It may be peat moss, compost, pine bark, rotted sawdust, or manure. Organic waste from the kitchen, leaves, grass clippings, and sawdust are excellent sources of composting material. Generally, at least 2 inches of organic matter and the required fertilizer should be spaded or rototilled into the top 8 inches of the native soil. If a more acid soil is needed, 1 to 2 pounds of sulfur per 100 square feet or commercially available soil acidifiers can be incorporated into the soil. Soils that are too strongly acid can be neutralized by additions of bonemeal, lime, wood ash, or topsoil that has a more favorable reaction. The type and amount of fertilizer and other soil amendments to be added to the soil should be based on a soil test or general recommendations for the area.

In areas of poorly drained soils, raised beds or drainage ditches are needed if flowers and some kinds of shrubs are to be grown. Raised beds also may be needed for some kinds of landscaping in areas of well drained soils. Brick, tile, metal, cedar, redwood, or treated pine (green tinted wood) is a good retainer along the edge of the beds. The beds should be filled with soil material that has well balanced physical and chemical amendments.

All plants require careful maintenance, especially during the period of establishment. Good management practices include applying fertilizer, watering, and controlling weeds and insects.

Gardening and landscaping should be included in the basic planning of urban uses. Protecting the existing trees is very important during the period of construction. Many trees are killed or damaged beyond restoration because of carelessness in excavation, grade changes, soil compaction, or pavement over tree roots. In wooded areas large, healthy trees are a valuable asset.

Homeowners may want to grow a variety of plants that not only contribute to the esthetic value of their homes but also provide fresh fruit for home use or for sale. Some of the fruit-bearing vines, shrubs, and trees and nut-bearing trees are listed in table 9. Some of these plants are native to Harrison County, and many are well suited to fruit production. Small orchards are becoming more numerous in the county.

Additional information about landscaping and gardening can be obtained from a local nursery, the Soil Conservation Service, the Texas Forest Service, and the Texas Agricultural Extension Service.

Recreation

Edward M. Schwille, biologist, Soil Conservation Service, and Joe Campo, biologist, Texas Parks and Wildlife Department, helped prepare this section.

Harrison County has the wildlife, water areas, and beauty characteristic of the Pineywoods. About 90 percent of the county is used for recreational activities, including camping, swimming, boating, hunting, fishing, bird-watching, picnicking, hiking, and sightseeing. The county also provides opportunities for photography. It has many vacation cabins (fig. 11) and cottages and several youth or church camps.

Caddo Lake, Lake O' The Pines, Big Cypress Bayou, Little Cypress Bayou, the Sabine River, and numerous creeks and small impoundments provide opportunities for recreation. In the spring flowering dogwood, redbud, hawthorn, clover, and wildflowers add color to the

Figure 11.—Weekend homes are common along Big Cypress Bayou and Caddo Lake. Houses are elevated to reduce the risk of flooding.

forests and open areas. Caddo State Park, which is managed by the Parks Division of the Texas Parks and Wildlife Department, provides excellent recreational facilities in the northeastern part of the county.

Leases are available from some landowners for deer hunting. Opportunities for waterfowl hunting are provided by Caddo Lake (fig. 12), Lake O' The Pines, the Sabine River, and Cypress Bayou. Generally, the hunting clubs in the county are on the timber company lands.

In table 11, the soils of the survey area are rated according to the limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewer lines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation are also important. Soils subject to flooding are limited for recreational uses by the duration and intensity of flooding and the season when flooding occurs. In planning recreational facilities, onsite assessment of the

Figure 12.—Duck hunting is a popular sport on Caddo Lake.

height, duration, intensity, and frequency of flooding is essential.

In table 11, the degree of soil limitation is expressed as slight, moderate, or severe. *Slight* means that soil properties are generally favorable and that limitations are minor and easily overcome. *Moderate* means that limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

The information in table 11 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 14 and interpretations for dwellings without basements and for local roads and streets in table 13.

Camp areas require site preparation, such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils have gentle slopes and are not wet or subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones or boulders can greatly increase the cost of constructing campsites.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for picnic areas are firm when wet, are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes, stones, or boulders that increase the cost of shaping

sites or of building access roads and parking areas.

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is free of stones and boulders, is firm after rains, and is not dusty when dry. If grading is needed, the depth of the soil over bedrock or a hardpan should be considered.

Paths and trails for hiking and horseback riding should require little or no cutting and filling. The best soils are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once a year during the period of use. They have moderate slopes and few or no stones or boulders on the surface.

Wildlife Habitat

Edward M. Schwille, biologist, Soil Conservation Service, and Joe Campo, biologist, Texas Parks and Wildlife Department, helped prepare this section.

Harrison County has valuable fish and wildlife resources. Streams and lakes of all sizes provide excellent habitat for fish. The forested areas and the interspersed open areas provide wildlife habitat throughout the county.

Many of the soils in Harrison County are suitable for water impoundments. Ponds, small lakes, and large impoundments are stocked and managed for largemouth bass, channel catfish, crappie, bluegill, and redear sunfish. Other species that inhabit streams and public impoundments include freshwater drum, flathead catfish, bullhead catfish, carp, gar, grass pickerel, bowfin, buffalo, white bass, gizzard shad, green sunfish, and various other sunfish. Many of these species find their way into unmanaged ponds and lakes. Many small ponds, both new and renovated, are stocked with channel catfish.

Big Cypress Bayou and Little Cypress Bayou are the major streams flowing through the county. Tributaries of Lake O' The Pines, which is mostly in Marion County, extend into the northwestern part of Harrison County. The southwest boundary of Harrison County is the Sabine River. Caddo Lake, the only natural lake in Texas, is on the northeast boundary of the county. Other lakes in the county include Eastman Lake, Brandy Branch Reservoir, Shadowood Lake, Fern Lake, Highland Lake, Holmes Lake, and Big Rock Lake. The county has numerous small impoundments.

The water in the ponds and lakes of Harrison County is acidic. As a result, fish production is low or medium. Applying agricultural lime at rates of 1 to 3 tons per surface acre can improve the quality of the water and increase fish production. Submerged and floating aquatic weeds pose some problems in areas of clear water.

There is very little aquaculture in Harrison County. One crawfish operation is presently under construction. Fish for recreational stocking in ponds and small lakes are available in nearby counties. Expansion of aquaculture will depend on an adequate water supply, improvement of water quality, and marketing.

The major game species in the county include whitetail deer, fox squirrel, gray squirrel, and waterfowl. The county has a limited population of bobwhite quail and mourning dove. Eastern wild turkey is being reintroduced into the county. Raccoon, flying squirrel, opossum, striped skunk, armadillo, cottontail rabbit, swamp rabbit, numerous other rodents, and songbirds also inhabit the county. The most common predators are coyote, gray fox, and bobcat. Beaver, nutria, mink, and river otter are in areas of aquatic habitat.

Several reptiles and amphibians inhabit the county. The best known of these are the cottonmouth, southern copperhead, northern copperhead, coral snake, timber rattlesnake, canebrake rattlesnake, water snakes, green bull frog, tree frog, snapping turtle, numerous other turtles, and alligators.

Wood ducks are permanent residents of the county. Coot, cormorant, and water turkey are in some areas. During migration periods, waterfowl, such as teals, northern mallards, and pintail, gadwall, widgeon, spoonbill, ring-necked, and canvasback ducks, use the existing water areas for resting, feeding, and roosting.

Many songbirds, raptors, vultures, and shore birds migrate to the county. Bald eagles are occasionally observed around the large impoundments.

The areas of pine and hardwoods have the best potential for improvement of wildlife habitat. Good management practices include maintaining natural stands that provide a highly diverse habitat, designing timber stands so that they provide the most edge per acre, retaining hardwoods along drainageways, harvesting timber selectively so that the stands include trees of all ages, burning and thinning pine plantations, and regenerating pine by moderate site preparation that prevents severe loss of habitat diversity.

The rolling part of the county has a mixture of loblolly pine, shortleaf pine, sweetgum, post oak, and southern red oak. Other plants are white oak, beech, flowering dogwood, yaupon, greenbrier, American beautyberry, tickclover, and little bluestem. This habitat supports a good population of whitetail deer and fox squirrel. Good timber management and development of supplemental food plots have improved the habitat for deer. Eastern wild turkey was stocked in 1983 and 1984. The number of quail and mourning dove is adequate for brood stock to populate areas of suitable habitat.

Native or introduced grasses are interspersed in the areas of pine and hardwoods. The habitat is open where the woody plants were removed and the soils were cultivated or improved grasses were established, resulting in a serious loss of habitat for woodland wildlife. The native vegetation includes threeawn, dropseed, tickclover, beaked panicum, Florida paspalum, and broomsedge bluestem. Bahiagrass, coastal bermudagrass, and common bermudagrass have been planted. Small grain is planted for wildlife food and for some livestock grazing. Most of the open areas have been overseeded with arrowleaf or crimson clover, which provides food for deer. Quail and mourning dove inhabit areas where crop residue and weed seeds remain. Quail numbers have declined in previously cultivated areas that have been planted to bermudagrass.

Willow oak, water oak, and blackgum are the major trees on the flood plains along the Sabine River and along other large streams in the county. Associated plants include various other oaks, elm, sweetgum, hawthorn, supplejack, greenbrier, blackberry, sedges, and smartweed. These areas provide good habitat for a large population of gray squirrels. Deer and furbearers also inhabit these areas; however, the lack of openland habitat severely limits the number of quail and mourning dove.

A small area of wetland habitat in which the predominant trees are baldcypress and water tupelo is along the upper reaches of Caddo Lake. Other aquatic vegetation includes coontail, cutgrass, smartweed, American lotus, and sedges. Nonaquatic species include supplejack, river birch, and water elm. Aquatic animals, squirrels, deer, various birds, reptiles, and amphibians inhabit this area.

Most wildlife habitat is created or managed by establishing, maintaining, or manipulating the vegetation required by the desirable game species. Conservation practices should be applied on the basis of the habitat needs of the desirable wildlife. Many of these practices can be detrimental rather than beneficial if they are arbitrarily applied. Managing for game species generally improves the habitat for many nongame species. Trained professionals from the Harrison County Soil and Water Conservation District, the Texas Parks and Wildlife Department, or the Texas Agricultural Extension Service should be contacted before management practices are applied.

The wetlands in the county may support willow oak, water oak, blackgum, baldcypress, or water tupelo. They are in areas of small and large water impoundments. The most common soils on the alluvial flood plains are those of the Bibb, Cypress, Estes, Iuka, Mantachie, Mathiston, Mooreville, Nugent, Sardis, and Socagee series. Wet soils on terraces include those of the Guyton and Mollville series. The soils on flood plains and terraces are among the most productive soils in the county for wildlife. The flood plains and water areas that include sloughs and oxbows provide wintering habitat for waterfowl, such as wood ducks, mallards, teal, and pintail. The shallow water areas provide important brood-rearing habitat for wood ducks. Open bodies of water make up the bulk of the remaining wetlands in the county. They provide resting and feeding areas for migrating waterfowl and shore birds. They also provide good habitat for furbearers and alligators.

Some endangered or threatened species inhabit or may inhabit Harrison County. Red-cockaded woodpecker colonies are in the areas of pine and hardwoods. Arctic peregrine falcon, osprey, wood stork, tailed kite, northern bald eagle, and southern bald eagle migrate through the county each fall and spring. They are evident in areas around Caddo Lake, Lake O' The Pines, and the Sabine River. Bald eagles winter in the county. The ivory-billed woodpecker formerly inhabited the county. The American alligator, which was recently removed from the list of threatened species, is now common in the county.

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. They also affect the construction of water impoundments. The kind and abundance of wildlife depend largely on the amount and distribution of food, cover, and water. Wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants.

In table 12, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* indicates that the element or kind of habitat is easily established, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected. A rating of *fair* indicates that the element or kind of habitat can be established, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* indicates that limitations are severe for the designated element or kind of habitat. Habitat can be created, improved, or

maintained in most places, but management is difficult and must be intensive. A rating of *very poor* indicates that restrictions for the element or kind of habitat are very severe and that unsatisfactory results can be expected. Creating, improving, or maintaining habitat is impractical or impossible.

The elements of wildlife habitat are described in the following paragraphs.

Grain and seed crops are domestic grains and seed-producing herbaceous plants. Soil properties and features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, surface stoniness, and flooding. Soil temperature and soil moisture are also considerations. Examples of grain and seed crops are corn, wheat, oats, grain sorghum, cowpea, and rye.

Grasses and legumes are perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flooding, and slope. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are fescue, bahiagrass, lovegrass, vetch, clover, and singletary pea.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flooding. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are bluestem, lespedeza, wildrye, tickclover, sunflowers, partridge pea, and croton.

Hardwood trees and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwood trees and shrubs are depth of the root zone, available water capacity, and wetness. Examples of these plants are oak, ash, pecan, sweetgum, hawthorn, hickory, and elm. Examples of fruit-producing shrubs that are suitable for planting on soils rated *good* are dogwood, yaupon, rusty blackhaw, and farkleberry.

Coniferous plants furnish browse and seeds. Soil properties and features that affect the growth of coniferous trees, shrubs, and ground cover are depth of the root zone, available water capacity, and wetness. Examples of coniferous plants are pine, baldcypress, and eastern redcedar.

Shrubs are bushy woody plants that produce fruit, buds, twigs, bark, and foliage. Soil properties and features that affect the growth of shrubs are depth of the root zone, available water capacity, salinity, and soil moisture. Examples of shrubs are American beautyberry, waxmyrtle, sumac, and yaupon.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, reaction, salinity, slope, and surface stoniness. Examples of wetland plants are smartweed, wild millet, Japanese millet, sesbania, swamp cyrilla, buttonbush, rushes, sedges, and reeds.

Shallow water areas have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams, levees, or other water-control structures. Soil properties and features affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. Examples of shallow water areas are marshes, waterfowl feeding areas, and ponds.

The habitat for various kinds of wildlife is described in the following paragraphs.

Habitat for openland wildlife consists of cropland, pasture, clearings, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. Wildlife attracted to these areas include bobwhite quail, meadowlark, field sparrow, cottontail, eastern wild turkey, mourning dove, mockingbird, whitetail deer, and coyote.

Habitat for woodland wildlife consists of areas of deciduous plants or coniferous plants or both and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include eastern wild turkey, bobcat, woodcock, thrushes, woodpeckers, squirrels, raccoon, and whitetail deer.

Habitat for wetland wildlife consists of open, marshy or swampy shallow water areas. Some of the wildlife attracted to such areas are wood ducks, mallards, herons, shore birds, nutria, mink, and beaver.

Surface Mine Reclamation

Norman P. Bade, conservation agronomist, Soil Conservation Service, helped prepare this section.

Lignite deposits underlie many of the soils in the survey area. Strip-mining the lignite results in large areas of disturbed land. Surface mining for lignite is accomplished by clearing the existing vegetation, removing all overburden, mining the lignite, and replacing the overburden.

Current Texas regulations require that all mine sites be reclaimed according to a prepared and approved reclamation plan, which includes the vegetation of the area. The applicant is responsible for establishing an

adequate plant cover and for maintaining the plant cover for a designated period. National and State regulations should be considered in the planning, site selection, design, and application of any reclamation procedures.

The objectives of reclamation are to restore the productivity of the soil, to prevent permanent damage, and to control erosion and sedimentation. Because mining results in major soil disturbances, more soil amendments, plant seeds and sprigs, and subsequent management generally are needed in the initial stages of reclamation.

Successful reclamation of strip-mined soils requires an understanding of the chemical, physical, and biological properties of the soils. Many of these properties are greatly altered by mining. A high content of acid-forming material and a low content of organic matter in the reconstructed surface soil can have an adverse effect on land use and soil productivity after reclamation. The best material available should be selected for use as the surface soil.

In one method of soil reconstruction, the spoil mounds are graded to the planned contour and revegetated. An example of a soil that has been reconstructed by this method is Marklake fine sandy loam, 1 to 3 percent slopes.

In another method, the topsoil is removed and stockpiled before mining. After the lignite is removed, the spoil mounds are graded to the planned contour. About 42 inches of selected oxidized material is then placed on the surface. At least 6 inches of topsoil is then added, so that the reconstructed oxidized material is at least 48 inches thick. The soil is then revegetated. An example of a soil that has been reconstructed by this method is Pirkey very fine sandy loam, 1 to 3 percent slopes.

Following reconstruction, the land can be used for cropland, pasture, wildlife habitat, woodland, orchards, recreational activities, or residential or industrial development. The selected land use determines the type of plant material to be used and the procedures needed for reclamation.

The method of reconstruction is important to the success of reclamation efforts. Replacement of topsoil helps to retain the vegetative material and seeds native to the area. It also retains the organic matter and micro-organisms normally in the surface layer. The random mixing of all overburden can alter many of the soil properties, resulting initially in an increased hazard of erosion, a decreased content of organic matter, and surface crusting. Tests for chemical properties are needed because unoxidized geologic material from the lower depths may contain acid-forming pyrites.

Revegetation of mined areas requires a good seedbed, adequate amounts of fertilizer, and the selection of plants that help to control erosion. The plants commonly used for cover and forage include coastal, common, and Tifton 44 bermudagrass; selection 75 kleingrass; and Pensacola bahiagrass. Other important species include Lehmann lovegrass, Alamo switchgrass, and Lometa indiangrass. Including legumes, such as Yuchii arrowleaf clover, crimson clover, Okinawa sericea lespedeza, and hairy vetch, in the areas to be revegetated increases forage production and provides nitrogen for the other plant species. Other legumes and forbs, such as bushsunflower, singletary pea, Englemann daisy, and Aztec Maximilian sunflower, increase the diversity of wildlife habitat.

Engineering

Gerald L. Krafka, civil engineer, Soil Conservation Service, helped prepare this section.

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. Ratings are given for building site development, sanitary facilities, construction materials, and water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil Properties" section.

Information in this section is intended for use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations should be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 or 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about

kinds of clay minerals, mineralogy of the sand and silt fractions, and the kind of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses *(10)*.

This information can be used to evaluate the potential of areas for residential, commercial, industrial, and recreational uses; make preliminary estimates of construction conditions; evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; plan detailed onsite investigations of soils and geology; locate potential sources of gravel, sand, earthfill, and topsoil; plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, used with the soil maps, the soil descriptions, and other data provided in this survey, can help in making additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the "Glossary."

Building Site Development

Table 13 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to bedrock, a cemented pan, or a very firm, dense layer; stone content; soil texture; and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and depth to the water table.

Dwellings and *small commercial buildings* are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements, for dwellings with basements, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, shrinking and swelling, and organic layers can cause the movement of footings. A high water table, depth to bedrock or to a cemented pan, large stones, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 or 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material; a base of gravel, crushed rock, or stabilized soil material; and a flexible or rigid surface. Cuts and fills are generally limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. Depth to bedrock or to a cemented pan, a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, frost action potential, and depth to a high water table affect the traffic-supporting capacity.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. The ratings are based on soil properties, site features, and observed performance of the soils. Soil reaction, a high water table, depth to bedrock or to a cemented pan, the available water capacity in the upper 40 inches, and the content of salts, sodium, and sulfidic materials affect plant growth. Flooding, wetness, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer affect trafficability after vegetation is established.

Sanitary Facilities

Table 14 shows the degree and kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if

soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table 14 also shows the suitability of the soils for use as daily cover for landfill. A rating of *good* indicates that soil properties and site features are favorable for the use and that good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches is evaluated. The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, depth to a high water table, depth to bedrock or to a cemented pan, and flooding affect absorption of the effluent. Large stones and bedrock or a cemented pan interfere with installation.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel or fractured bedrock is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to filter the effluent effectively. Many local ordinances require that this material be of a certain thickness.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water.

Table 14 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, depth to a high water table, depth to bedrock or to a cemented pan, flooding, large stones, and content of organic matter.

Excessive seepage resulting from rapid permeability in the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope, bedrock, and cemented pans can cause construction problems, and large stones can hinder compaction of the lagoon floor.

Sanitary landfills are areas where solid waste is disposed of by burying it in soil. There are two types of landfill—trench and area. In a trench landfill, the waste is placed in a trench. It is spread, compacted, and covered daily with a thin layer of soil excavated at the site. In an area landfill, the waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site.

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of ground-water pollution. Ease of excavation and revegetation should be considered.

The ratings in table 14 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock or to a cemented pan, depth to a water table, slope, and flooding affect both types of landfill. Texture, stones and boulders, highly organic layers, soil reaction, and content of salts and sodium affect trench landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste.

Soil texture, wetness, coarse fragments, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils that are free of large stones or excess gravel are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to soil blowing.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock, a cemented pan, or the water table to permit revegetation. The soil material used as

final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

Construction Materials

Table 15 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a *probable* or *improbable* source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering index properties provides detailed information about each soil layer. This information can help to determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by large stones, a high water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

Soils rated *good* contain significant amounts of sand or gravel or both. They have at least 5 feet of suitable material, a low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have a moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10, a high shrink-swell potential, many stones, or slopes of more than 25 percent. They are wet and have a water table at a depth of less than 1 foot. They may have layers of suitable material, but the material is less than 3 feet thick.

Sand and *gravel* are natural aggregates suitable for commercial use with a minimum of processing. They are used in many kinds of construction. Specifications for each use vary widely. In table 15, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil), the thickness of suitable material, and the content of rock fragments. Kinds of rock, acidity, and stratification are given in the soil series descriptions. Gradation of grain sizes is given in the table on engineering index properties.

A soil rated as a probable source has a layer of clean sand or gravel or a layer of sand or gravel that is up to 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an improbable source. Coarse fragments of soft bedrock, such as shale and siltstone, are not considered to be sand and gravel.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by rock fragments, slope, a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, a water table, rock fragments, bedrock, and toxic material.

Soils rated *good* have friable, loamy material to a depth of at least 40 inches. They are free of stones and cobbles, have little or no gravel, and have slopes of less than 8 percent. They are low in content of soluble salts, are naturally fertile or respond well to fertilizer, and are not so wet that excavation is difficult.

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20 to 40 inches of suitable material, soils that have an appreciable amount of gravel, stones, or soluble salts, or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey, have less than 20 inches of suitable material, have a large amount of gravel, stones, or soluble salts, have slopes

of more than 15 percent, or have a seasonal high water table at or near the surface.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and plant nutrients as it decomposes.

Water Management

Table 16 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas and for embankments, dikes, and levees. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

This table also gives the restrictive features that affect each soil for drainage, irrigation, terraces and diversions, and grassed waterways.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones or boulders, organic matter, or salts or sodium. A high water table affects the amount of usable material. It also affects trafficability.

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock, to a cemented pan, or to other layers that affect the rate of water movement; permeability; depth to a high water table or depth of standing water if the soil is subject to ponding; slope; susceptibility to flooding; subsidence of organic layers; and the potential for frost action. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock or to a cemented pan, large stones, slope, and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the root zone, such as salts, sodium, or sulfur. Availability of drainage outlets is not considered in the ratings.

Irrigation is the controlled application of water to supplement rainfall and support plant growth. The design and management of an irrigation system are affected by depth to the water table, the need for drainage, flooding, available water capacity, intake rate, permeability, erosion hazard, and slope. The construction of a system is affected by large stones and depth to bedrock or to a cemented pan. The performance of a system is affected by the depth of the root zone, the amount of salts or sodium, and soil reaction.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to control erosion and conserve moisture by intercepting runoff. Slope, wetness, large stones, and depth to bedrock or to a cemented pan affect the construction of terraces and diversions. A restricted rooting depth, a severe hazard of soil blowing or water erosion, an excessively coarse texture, and restricted permeability adversely affect maintenance.

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Large stones, wetness, slope, and depth to bedrock or to a cemented pan affect the construction of grassed waterways. A hazard of soil blowing, low available water capacity, restricted rooting depth, toxic substances such as salts or sodium, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

Soil Properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features, listed in tables, are explained on the following pages.

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics. These results are reported in table 23.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help to characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classification, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

Engineering Index Properties

Table 17 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under the heading "Soil Series and Their Morphology."

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is as much as 15 percent, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the "Glossary."

Classification of the soils is determined according to the Unified soil classification system *(2)* and the system adopted by the American Association of State Highway and Transportation Officials *(1)*.

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, SP-SM.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20, or higher, for the poorest. The AASHTO classification for soils tested, with group index numbers in parentheses, is given in table 23.

Rock fragments 3 to 10 inches in diameter are indicated as a percentage of the total soil on a

dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

Physical and Chemical Properties

Table 18 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Clay as a soil separate, or component, consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each major soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They determine the ability of the soil to adsorb cations and to retain moisture. They influence the shrink-swell potential, permeability, plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at ⅓-bar moisture tension. Weight is determined after drying the soil at 105 degrees C. In this table, the estimated moist bulk density of each major soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of movement of water through the soil when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems and septic tank absorption fields.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage in each major soil layer is stated in inches of water per inch of soil. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Soil reaction is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Salinity is a measure of soluble salts in the soil at saturation. It is expressed as the electrical conductivity of the saturation extract, in millimhos per centimeter at 25 degrees C. Estimates are based on field and laboratory measurements at representative sites of nonirrigated soils. The salinity of irrigated soils is affected by the quality of the irrigation water and by the frequency of water application. Hence, the salinity of soils in individual fields can differ greatly from the value given in the table. Salinity affects the suitability of a soil for crop production, the stability of soil if used as construction material, and the potential of the soil to corrode metal and concrete.

Shrink-swell potential is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on measurements of similar soils.

If the shrink-swell potential is rated moderate to very

high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed.

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The classes are *low,* a change of less than 3 percent; *moderate,* 3 to 6 percent; and *high,* more than 6 percent. *Very high,* more than 9 percent, is sometimes used.

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion. Losses are expressed in tons per acre per year. These estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Values of K range from 0.02 to 0.69. The higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur over a sustained period without affecting crop productivity. The rate is expressed in tons per acre per year.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In table 18, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter in a soil can be maintained or increased by returning crop residue to the soil. Organic matter affects the available water capacity, infiltration rate, and tilth. It is a source of nitrogen and other nutrients for crops.

Soil and Water Features

Table 19 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils are assigned to one of four groups. They are grouped according to the infiltration of water when the soils are thoroughly wet and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Flooding, the temporary covering of the soil surface by flowing water, is caused by overflowing streams, by runoff from adjacent slopes, or by inflow from high tides. Shallow water standing or flowing for short periods after rainfall or snowmelt is not considered flooding. Standing water in swamps and marshes or in a closed depression is considered ponding.

Table 19 gives the frequency and duration of flooding and the time of year when flooding is most likely.

Frequency, duration, and probable dates of occurrence are estimated. Frequency generally is expressed as *none, rare, occasional,* or *frequent. None* means that flooding is not probable. *Rare* means that flooding is unlikely but possible under unusual weather conditions (the chance of flooding is nearly 0 percent to 5 percent in any year). *Occasional* means that flooding occurs infrequently under normal weather conditions (the chance of flooding is 5 to 50 percent in any year). *Frequent* means that flooding occurs often under normal weather conditions (the chance of flooding is more than 50 percent in any year). Duration is expressed as *very brief* (less than 2 days), *brief* (2 to 7 days), *long* (7 days to 1 month), and *very long* (more than 1 month). The time of year that floods are most likely to occur is expressed in months. About two-thirds to three-fourths of all flooding occurs during the stated period.

The information on flooding is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and little or no horizon development.

Also considered is local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the

extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The estimates are based mainly on the evidence of a saturated zone, namely grayish colors or mottles in the soil. Indicated in table 19 are the depth to the seasonal high water table; the kind of water table, that is, *perched* or *apparent;* and the months of the year that the water table commonly is highest. A water table that is seasonally high for less than 1 month is not indicated in table 19.

An *apparent* water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil. A *perched* water table is water standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

Two numbers in the column showing depth to the water table indicate the normal range in depth to a saturated zone. Depth is given to the nearest half foot. The first numeral in the range indicates the highest water level. A plus sign preceding the range in depth indicates that the water table is above the surface of the soil. "More than 6.0" indicates that the water table is below a depth of 6 feet or that it is within a depth of 6 feet for less than a month.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors results in a severe hazard of corrosion. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low, moderate*, or *high*, is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion is also expressed as *low, moderate*, or *high*. It is based on soil texture, acidity, and the amount of sulfates in the saturation extract.

Physical and Chemical Analyses of Selected Soils

The results of chemical analysis of several pedons in the survey area are given in table 20 and the results of physical analysis in table 21. The clay mineralogy of selected soils is given in table 22. The data are for soils sampled at carefully selected sites. Some of the pedons are typical of the series and are described in the section "Soil Series and Their Morphology." Soil samples were analyzed by the Soil Survey Laboratory, Soil Conservation Service, Lincoln, Nebraska, and by the Soil Characterization Laboratory, Texas A&M University, College Station, Texas.

Most determinations, except those for grain-size analysis and bulk density, were made on soil material smaller than 2 millimeters in diameter. Measurements reported as percent or quantity of unit weight were calculated on an ovendry basis. The methods used in obtaining the data are indicated in the list that follows. The codes in parentheses refer to published methods *(14)*.

Sand—(0.05-2.0 mm fraction) weight percentages of material less than 2 mm (3A1).
Silt—(0.002-0.05 mm fraction) pipette extraction, weight percentages of all material less than 2 mm (3A1).
Clay—(fraction less than 0.002 mm) pipette extraction, weight percentages of material less than 2 mm (3A1).
Base saturation—ammonium acetate, pH 7.0 (5C1).
Cation-exchange capacity—Steam distillation (5A8b).
Reaction (pH)—water dilution and $CaCl_2$ automated system (8clf).
Aluminum saturation—bases plus aluminum (5G1).
Aluminum—Atomic absorption (6G7a).
Magnesium—Atomic absorption (6O2d).
Potassium—Atomic absorption (6Q2b).
Sodium—Atomic absorption (6P2b).
Calcium—NH_4OAC extraction (6N2).
Organic carbon—$FeSO_4$ titration, automatic titrator (6A1C).
Bulk density—⅓-bar desorption 1 (Db ⅓)(4A1d).
Bulk density—ovendry (Dbd)(4A1h).
Coefficient of linear extensibility (COLE)—air-dry to ⅓-bar tension (4D1).
Water retention—natural clods (⅓-bar) (4B1C).
Mineralogy—thin film on glass, resin pretreatment 11 (7A2i).

Engineering Index Test Data

Table 23 shows laboratory test data for several pedons sampled at carefully selected sites in the survey

area. Some of the pedons are typical of the series and are described in the section "Soil Series and Their Morphology." The soil samples were tested by the Texas State Department of Highways and Public Transportation and the Soil Mechanics Laboratory, Soil Conservation Service, Fort Worth, Texas.

The testing methods generally are those of the American Association of State Highway and Transportation Officials (AASHTO) or the American Society for Testing and Materials (ASTM).

The tests and methods are AASHTO classification—M 145 (AASHTO), D 3282 (ASTM); Unified classification—D 2487 (ASTM); Mechanical analysis—T 88 (AASHTO), D 422 (ASTM), D 2217 (ASTM); Liquid limit—T 89 (AASHTO), D 4318 (ASTM); Plasticity index—T 90 (AASHTO), D 4318 (ASTM); Shrinkage—T 92 (AASHTO), D 427 (ASTM); and Particle density—T 100 (AASHTO), D 653 (ASTM).

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories *(12)*. Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or on laboratory measurements. Table 24 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Eleven soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Ultisol.

SUBORDER. Each order is divided into suborders, primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Udult (*Ud*, meaning humid, plus *ult*, from Ultisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Hapludults (*Hapl*, meaning minimal horizonation, plus *udult*, the suborder of the Ultisols that has a udic moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic Hapludults.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Generally, the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineral content, temperature regime, depth of the root zone, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is clayey, mixed, thermic Typic Hapludults.

SERIES. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. There can be some variation in the texture of the surface layer or of the substratum within a series.

Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. The descriptions are arranged in alphabetic order.

Characteristics of the soil and the material in which it formed are identified for each series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the "Soil Survey Manual" *(15)*. Many of the technical terms used in the descriptions are defined in "Soil Taxonomy" *(12)*. Unless otherwise stated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

The map units of each soil series are described in the section "Detailed Soil Map Units."

Bernaldo Series

The Bernaldo series consists of very deep soils on terrace remnants on upland stream divides of the Wilcox Group and on remnants of older terraces 25 to 200 feet above the present streams. These soils also

are on stream terraces 5 to 15 feet above the present flood plains. They are well drained and moderately permeable. They formed in loamy, old fluviatile sediments and in loamy Pleistocene sediments (fig. 13). Slopes range from 1 to 3 percent. The soils of the Bernaldo series are fine-loamy, siliceous, thermic Glossic Paleudalfs.

Typical pedon of Bernaldo fine sandy loam, 1 to 3 percent slopes; from the intersection of U.S. Highways 59 and 80 in Marshall, 1.5 miles south on U.S. Highway 59, about 11.0 miles southwest on Texas Highway 43, about 0.7 mile east and 0.7 mile south on a county road (Terrapin Neck), and 500 feet southeast of a cattle guard in a pasture:

A—0 to 3 inches; dark brown (10YR 4/3) fine sandy loam; weak fine subangular blocky structure; very friable; common fine and few medium roots; few fine and medium pores; slightly acid; clear smooth boundary.

E—3 to 11 inches; yellowish brown (10YR 5/4) fine sandy loam; weak fine subangular blocky structure; very friable; common fine and few medium roots; few fine and medium pores; medium acid; clear smooth boundary.

Bt1—11 to 17 inches; brown (7.5YR 5/4) loam; moderate fine subangular blocky structure; friable; common fine and medium roots; common fine to coarse pores; few very thin patchy clay films in pores and on faces of peds; medium acid; gradual smooth boundary.

Bt2—17 to 26 inches; strong brown (7.5YR 5/6) loam; moderate fine subangular blocky structure; friable; common fine and medium roots; common fine to coarse pores; few very thin patchy clay films in pores and on faces of peds; medium acid; gradual smooth boundary.

Bt3—26 to 43 inches; yellowish brown (10YR 5/6) loam; few fine prominent yellowish red (5YR 5/8) and few fine distinct strong brown (7.5YR 5/6) mottles; moderate fine and medium subangular blocky structure; friable; common fine and medium roots; common fine and medium and few coarse pores; common thin patchy clay films in pores and on faces of peds; few fine black concretions; strongly acid; gradual smooth boundary.

Bt/E1—43 to 62 inches; yellowish brown (10YR 5/6) loam (Bt); common medium distinct strong brown (7.5YR 5/6) and common medium prominent red (2.5YR 4/8) mottles; moderate coarse prismatic structure parting to moderate medium and coarse subangular blocky; friable; few fine roots; common fine to coarse pores; common medium continuous clay films on vertical faces of peds; few fine brownish concretions; about 2 percent, by volume, nodular plinthite; about 10 to 12 percent, by volume, pale brown (10YR 6/3) E material occurring as silt-coated skeletans on vertical prisms; strongly acid; gradual smooth boundary.

Bt/E2—62 to 80 inches; brownish yellow (10YR 6/6) loam (Bt); common coarse prominent red (2.5YR 4/6) and common medium distinct light brownish gray (10YR 6/2) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; friable; few fine roots; common fine to coarse pores; many light gray (10YR 6/1) thick continuous clay films on vertical faces of peds; brittle in about 10 to 15 percent of the horizon; about 12 to 15 percent, by volume, light gray (10YR 7/2) and very pale brown (10YR 7/3) E material occurring as skeletans on vertical prisms; few fine nodules of plinthite; very strongly acid; gradual smooth boundary.

B't—80 to 95 inches; strong brown (7.5YR 5/6) loam; many coarse prominent light brownish gray (10YR 6/2) and common medium distinct brownish yellow (10YR 6/8) and yellowish red (5YR 5/6) mottles; weak coarse prismatic structure parting to weak coarse subangular blocky; friable; few fine roots; common medium pores; many coarse clay films on vertical faces of peds; brittle in about 20 to 30 percent of the horizon; about 2 to 3 percent, by volume, E material on vertical prisms; very strongly acid.

The solum ranges from 60 to more than 80 inches in thickness. The depth to horizons that have more than 5 percent, by volume, pockets, lenses, interfingers, and coatings of E material is 38 to 60 inches. The control section ranges from 23 to 30 percent clay. The combined thickness of the A and E horizons ranges from 6 to 19 inches.

The A horizon is yellowish brown, brown, dark grayish brown, or dark brown. Reaction ranges from strongly acid to slightly acid in unlimed areas.

The E horizon is light brown, light yellowish brown, yellowish brown, brown, or very pale brown. The texture is fine sandy loam or loam. Reaction ranges from strongly acid to slightly acid.

The Bt horizon is reddish yellow, brownish yellow, yellowish brown, brown, strong brown, or yellowish red. Few to many, fine or medium mottles in shades of yellow, brown, or red may occur in this horizon. The texture is loam, clay loam, or sandy clay loam. The content of clay ranges from 18 to 30 percent. Pockets, lenses, interfingers, and coatings of E material along faces of peds may occur in the lower part of the Bt horizon, but they make up less than 5 percent, by

volume, of the horizon. Slightly brittle to brittle, yellowish red masses make up 0 to 15 percent of the matrix, by volume. The content of plinthite is less than 5 percent, by volume. Reaction ranges from very strongly acid to slightly acid.

The Bt part of the Bt/E horizon is brownish yellow, reddish yellow, yellowish brown, yellow, strong brown, or yellowish red. Few to many, fine to coarse mottles in shades of yellow, red, or brown may occur in this horizon. The texture is clay loam, loam, sandy clay loam, or fine sandy loam. The content of clay ranges from 16 to 30 percent. Pockets, lenses, interfingers, and coatings of E material along faces of peds make up 5 to 15 percent of the volume. They are light gray, light brownish gray, very pale brown, light yellowish brown, or grayish brown. They are 1 to 15 millimeters wide and 0.5 centimeter to 15 centimeters long. Slightly brittle, yellowish red masses make up 0 to 4 percent of the matrix, by volume. The content of plinthite is less than 5 percent, by volume. Reaction ranges from very strongly acid to slightly acid.

The B't and BC horizons, if they occur, are mottled brownish yellow, light gray, strong brown, yellowish red, or red. Some pedons have a light gray or brownish yellow matrix. Few to many, fine or medium mottles in shades of gray, brown, or red may occur in these horizons. The texture is sandy clay loam, clay loam, or loam. Pockets, lenses, interfingers, and coatings of E material along faces of peds make up 0 to 5 percent of the volume. They are light gray. These horizons have few or no shale and weakly consolidated sandstone fragments. Reaction is very strongly acid or strongly acid.

Bibb Series

The Bibb series consists of very deep soils on flood plains along local streams. These soils are poorly drained and moderately permeable. They formed in loamy alluvium. Slopes are 0 to 1 percent. The soils of the Bibb series are coarse-loamy, siliceous, acid, thermic Typic Fluvaquents.

Typical pedon of Bibb silt loam, frequently flooded; from the intersection of U.S. Highways 59 and 80 in Marshall, 1.5 miles south on U.S. Highway 59, about 4.9 miles southwest on Texas Highway 43, about 14.8 miles west on Interstate Highway 20, about 1.5 miles north on Loop 281, about 0.45 mile east on a county road, and 80 feet north of the center of a road in a pasture:

Ag1—0 to 3 inches; gray (10YR 5/1) silt loam; common fine distinct strong brown (7.5YR 4/6) and few fine faint dark yellowish brown (10YR 4/4) and dark grayish brown (10YR 4/2) mottles; moderate medium subangular blocky structure; very friable; many very fine, common fine, and few medium and coarse roots; few fine and medium pores; strongly acid; clear smooth boundary.

Ag2—3 to 8 inches; gray (10YR 5/1) silt loam; common fine prominent red (2.5YR 4/8), common fine distinct yellowish brown (10YR 5/6), and common fine faint light gray (10YR 6/1) mottles; moderate medium subangular blocky structure; friable; common fine and few medium roots; few fine and medium pores; very strongly acid; clear smooth boundary.

Btg—8 to 15 inches; light brownish gray (10YR 6/2) loam; common fine distinct brownish yellow (10YR 6/6) and few fine distinct strong brown (7.5YR 4/6) mottles; moderate coarse subangular blocky structure; very friable; few fine and few medium roots; few fine, few medium, and few coarse pores; few thin patchy clay films in pores; very strongly acid; clear smooth boundary.

Bg—15 to 24 inches; light brownish gray (10YR 6/2) fine sandy loam; common medium faint yellowish brown (10YR 5/8) and few fine distinct strong brown (7.5YR 5/8) mottles; moderate coarse subangular blocky structure; very friable; few fine and few medium roots; few fine, common medium, and common coarse pores; about 3 percent, by volume, skeletans along peds and pores; very strongly acid; clear smooth boundary.

Cg—24 to 64 inches; light brownish gray (10YR 6/2) fine sandy loam; common medium distinct brownish yellow (10YR 6/6) and yellow (10YR 6/8), few medium faint light yellowish brown (10YR 6/4), and few fine prominent strong brown (7.5YR 5/6) mottles; massive; very friable; few fine roots; many fine, common medium, and few coarse pores; about 4 percent, by volume, skeletans along peds and pores; very strongly acid.

The content of clay in the 10- to 40-inch control section ranges from 6 to 18 percent. A perched water table is at a depth of 0.5 foot to 1.5 feet from December through April. The C horizon has many, common, or no bedding planes.

The A or Ag horizon is dark gray, gray, light brownish gray, grayish brown, or dark grayish brown. It may have few to many mottles in shades of brown or red. Reaction is very strongly acid or strongly acid in unlimed areas.

The Bg or Btg horizon, if it occurs, is gray or light brownish gray. It may have few to many mottles in shades of brown, yellow, red, or gray. The texture varies. It is dominantly loam, but fine sandy loam and loamy sand are common. Reaction is very strongly acid or strongly acid.

The Cg horizon is gray, light gray, light brownish gray, or grayish brown. A few pedons have brownish matrix colors below a depth of 30 inches but have common or many grayish mottles. The horizon has few to many mottles in shades of brown, red, or gray throughout. The control section is loam, silt loam, very fine sandy loam, or fine sandy loam. Strata of loamy fine sand are in some pedons. Reaction is very strongly acid or strongly acid.

Bienville Series

The Bienville series consists of very deep soils on stream terraces 10 to 30 feet above the present flood plains. These soils are somewhat excessively drained and moderately rapidly permeable. They formed in sandy alluvium derived mainly from the Sabine River, Little Cypress Bayou, and Big Cypress Bayou. Slopes range from 1 to 3 percent. The soils of the Bienville series are sandy, siliceous, thermic Psammentic Paleudalfs.

Typical pedon of Bienville loamy fine sand, 1 to 3 percent slopes; from the intersection of U.S. Highways 59 and 80 in Marshall, 5.4 miles west on U.S. Highway 80, about 14.15 miles southwest on Farm Road 968, about 1.65 miles south and 1.9 miles southeast on a county road, 850 feet east on a private road, and 200 feet southeast in an area of woodland:

A—0 to 10 inches; dark yellowish brown (10YR 4/4) loamy fine sand; weak medium subangular blocky structure parting to weak fine granular; very friable; few coarse and common fine and medium roots; medium acid; gradual smooth boundary.

E—10 to 27 inches; yellowish brown (10YR 5/4) loamy fine sand; weak fine granular structure; very friable; few fine, medium, and coarse roots; strongly acid; gradual smooth boundary.

E/Bt—27 to 50 inches; light yellowish brown (10YR 6/4) loamy fine sand (E); about 40 percent, by volume, strong brown (7.5YR 5/6) lamellae 2 millimeters to 2 centimeters thick (Bt); weak fine granular structure; very friable; few fine roots; clay bridges between sand grains in the lamellae; medium acid; gradual smooth boundary.

Bt/E1—50 to 64 inches; strong brown (7.5YR 5/6) loamy fine sand (Bt); about 45 percent, by volume, light yellowish brown (10YR 6/4) lamellae of uncoated sand (E) 2 millimeters to 2 centimeters thick; weak fine granular structure; very friable; few fine roots; clay bridges between sand grains in the lamellae; medium acid; gradual smooth boundary.

Bt/E2—64 to 80 inches; strong brown (7.5YR 5/8) fine sandy loam (Bt); about 35 percent, by volume, pale brown (10YR 6/3) lamellae of uncoated sand (E) 2 millimeters to 2 centimeters thick; weak fine granular structure; very friable; few fine roots; clay bridges between sand grains in the lamellae; slightly acid.

The solum ranges from 60 to more than 80 inches in thickness. The depth to lamellae ranges from 20 to 60 inches. It commonly is less than 40 inches.

The A horizon is dark brown, yellowish brown, dark grayish brown, brown, or dark yellowish brown. Reaction ranges from very strongly acid to medium acid.

The E horizon is brown, light brown, yellowish brown, light yellowish brown, or pale brown. In some pedons it has few or common, fine or medium mottles in shades of brown or red. Reaction ranges from very strongly acid to slightly acid.

The E part of the E/Bt horizon is light yellowish brown, brown, yellowish brown, or very pale brown. It is fine sand or loamy fine sand. The lamellae (Bt part) are 2 millimeters to 5 centimeters thick. The cumulative thickness of the lamellae is more than 6 inches. The lamellae are strong brown, reddish yellow, or yellowish red. They make up 5 to 50 percent, by volume, of the horizon. They are fine sandy loam or loamy fine sand. Reaction ranges from very strongly acid to medium acid.

The Bt/E horizon is strong brown or yellowish red. In most pedons it has lamellae that are 2 millimeters to 5 centimeters thick. The cumulative thickness of the lamellae is more than 6 inches. The E material is brown, light yellowish brown, yellowish brown, or very pale brown. It makes up 5 to 50 percent, by volume, of the horizon. A few pedons have an argillic horizon without the lamellae and have similar colors. Some pedons have few or common, fine to coarse mottles in shades of brown, yellow, or red. The texture is mainly loamy fine sand, but in some pedons the lower part of the horizon is fine sandy loam. Reaction ranges from very strongly acid to medium acid.

Bonn Series

The Bonn series consists of very deep soils on stream terraces. These soils are poorly drained, are very slowly permeable, and are saturated in winter and early spring. They formed in loamy alluvial sediments that are high in content of exchangeable sodium. Slopes are 0 to 1 percent. The soils of the Bonn series are fine-silty, mixed, thermic Glossic Natraqualfs.

Typical pedon of Bonn silt loam, in an area of Bonn-Cart complex, 0 to 1 percent slopes; from the intersection of U.S. Highways 59 and 80 in Marshall,

11.5 miles south on U.S. Highway 59, about 1.8 miles southeast on Farm Road 1186, about 1,100 feet southwest on a private road, and 25 feet east in a native pasture:

A—0 to 6 inches; dark brown (10YR 4/3) silt loam; common fine distinct grayish brown (10YR 5/2) mottles in the lower part; moderate medium blocky structure parting to weak medium granular; friable; common fine and medium roots; strongly acid; clear smooth boundary.

E—6 to 12 inches; grayish brown (10YR 5/2) silt loam; common fine faint dark brown (10YR 4/3) mottles; moderate medium subangular blocky structure parting to weak medium granular; firm; common fine and medium roots; strongly acid; clear smooth boundary.

Btng/E1—12 to 22 inches; gray (10YR 5/1) loam; common fine prominent dark yellowish brown (10YR 4/6) mottles; moderate medium and coarse columnar structure; firm; few fine roots; about 40 percent, by volume, silt loam (E), of which 25 percent is tongues 12 to 15 millimeters wide and 50 to 75 millimeters long and 15 percent is interfingers 1 to 10 millimeters wide and 25 to 40 millimeters long; clay bodies 5 to 20 millimeters in diameter in the Bt part; common thin clay films on faces of peds; electrical conductivity of 2.1; sodium adsorption ratio of 16.6; mildly alkaline; gradual wavy boundary.

Btng/E2—22 to 43 inches; grayish brown (10YR 5/2) clay loam; common medium prominent yellowish red (5YR 5/8) mottles; moderate medium and coarse prismatic structure; firm; about 30 percent, by volume, light brownish gray (10YR 6/2) E material occurring as 15 percent tongues 10 to 15 millimeters wide and 2 to 4 inches long and 15 percent lenses and interfingers; few fine black concretions; few thin patchy clay films on faces of peds; neutral; gradual smooth boundary.

Btng1—43 to 68 inches; light gray (10YR 7/1) silty clay loam; few fine prominent yellowish red (5YR 5/8) mottles; moderate fine and medium prismatic structure; firm; few fine reddish concretions; few fine pressure faces; few fine white salt crystals; few thin patchy clay films on faces of peds; neutral; gradual wavy boundary.

Btng2—68 to 76 inches; light gray (10YR 7/1) clay loam; many fine and medium prominent yellowish red (5YR 5/8) mottles; moderate fine and medium prismatic structure; firm; few fine black and red concretions; few thin patchy clay films on faces of peds; mildly alkaline; gradual wavy boundary.

Cn—76 to 80 inches; light gray (10YR 7/1), stratified clay loam and silty clay loam; common medium and coarse prominent yellowish red (5YR 5/8) mottles; massive; firm; mildly alkaline.

The solum is as much as 60 inches thick. Exchangeable sodium saturation ranges from 15 to 30 percent in all horizons below a depth of 16 inches. The control section ranges from 20 to 30 percent clay and averages less than 15 percent material coarser than very fine sand.

The A horizon is grayish brown, very dark grayish brown, dark brown, dark grayish brown, or brown. Reaction ranges from very strongly acid to slightly acid.

The E horizon is light brownish gray, grayish brown, or gray loam or silt loam. Few or common, fine or medium mottles in shades of gray or brown may occur in this horizon. Reaction ranges from very strongly acid to neutral.

The B part of the Btng/E horizon is light brownish gray, grayish brown, or gray. Few to many, fine to coarse mottles in shades of red or yellow may occur in this horizon. Tongues of E material make up 15 to 50 percent, by volume, of the matrix. Reaction ranges from slightly acid to moderately alkaline. The top of columns in the upper part of the Bt horizon has biscuit-shaped caps that are weakly expressed in some pedons. The texture is silt loam, silty clay loam, or clay loam. The content of clay ranges from 18 to 35 percent.

The Btng horizon is light gray, light brownish gray, or gray. It has few to many, fine to coarse mottles in shades of red or yellow. The texture is silt loam, silty clay loam, or clay loam. Reaction ranges from slightly acid to moderately alkaline.

The BC or C horizon, if it occurs, has colors in shades of gray and may have mottles in shades of red, yellow, or brown. The texture varies but generally is silty. Reaction ranges from neutral to moderately alkaline.

Bowie Series

The Bowie series consists of very deep soils on uplands. These soils are on slightly convex flats and in saddles between hilltops. They are moderately well drained and moderately slowly permeable. They formed in loamy deposits of Carrizo Sand, the Reklaw Formation, and Queen City Sand (fig. 14). Slopes range from 2 to 5 percent. The soils of the Bowie series are fine-loamy, siliceous, thermic Plinthic Paleudults.

Typical pedon of Bowie very fine sandy loam, 2 to 5 percent slopes; from the intersection of U.S. Highways 59 and 80 in Marshall, 4.4 miles south on U.S. Highway 59, about 6.7 miles west on Interstate 20, about 1.0 mile south on Farm Road 3251, about 0.9 mile west on a county road, and 300 feet north in a native pasture:

Ap—0 to 5 inches; dark brown (10YR 4/3) very fine sandy loam; weak fine granular structure; slightly hard, very friable, nonsticky and nonplastic; many fine and common medium roots; 1 to 2 percent, by volume, ironstone pebbles 2 to 5 millimeters in size; medium acid; clear smooth boundary.

E—5 to 10 inches; yellowish brown (10YR 5/4) very fine sandy loam; weak medium subangular blocky structure parting to weak fine granular; slightly hard, very friable, nonsticky and nonplastic; common fine and few medium roots; 1 to 2 percent, by volume, ironstone pebbles 2 to 5 millimeters in size; strongly acid; clear smooth boundary.

Bt1—10 to 23 inches; yellowish brown (10YR 5/8) sandy clay loam; few fine prominent yellowish red (5YR 5/6) mottles; moderate fine and medium subangular blocky structure; hard, friable, slightly sticky and slightly plastic; few fine roots; few fine pores; few thin patchy clay films on sand grains and in pores and root channels; about 4 to 5 percent, by volume, ironstone pebbles 2 to 8 millimeters in size; strongly acid; clear smooth boundary.

Bt2—23 to 31 inches; yellowish brown (10YR 5/6) clay loam; common medium prominent yellowish red (5YR 5/6) and common coarse prominent red (2.5YR 5/6) mottles; moderate fine and medium subangular blocky structure; hard, friable, slightly sticky and slightly plastic; few fine roots; few fine pores; common thin patchy clay films on faces of peds; about 2 to 3 percent, by volume, ironstone pebbles 2 to 8 millimeters in size; about 2 percent, by volume, nodular plinthite; very strongly acid; clear smooth boundary.

Btv—31 to 46 inches; yellowish brown (10YR 5/6) sandy clay loam; common medium prominent yellowish red (5YR 5/6) and common coarse prominent red (2.5YR 5/6) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; moderately brittle in about 5 to 10 percent of the horizon, by volume; hard, friable, slightly sticky and slightly plastic; few fine roots; common fine pores; common thin continuous clay films on faces of peds; about 2 percent, by volume, ironstone pebbles 5 to 10 millimeters in size; about 8 to 10 percent, by volume, red (2.5YR 4/8) nodular plinthite; about 2 percent, by volume, E material occurring as lenses on faces of peds; very strongly acid; gradual smooth boundary.

Btv/E—46 to 68 inches; yellowish brown (10YR 5/6) sandy clay loam; many coarse prominent red (2.5YR 5/6), many medium faint brownish yellow (10YR 6/6), and many coarse prominent light brownish gray (10YR 6/2) mottles; about 10 percent, by volume, lenses and interfingers of very pale brown (10YR 7/4) E material on faces of prisms; moderate medium prismatic structure parting to moderate medium subangular blocky; moderately brittle in about 15 to 20 percent of the horizon, by volume; very hard, friable, slightly sticky and slightly plastic; very few fine roots, mainly along prisms; common fine and medium pores; common thin continuous clay films on faces of peds; about 5 to 7 percent, by volume, red (2.5YR 4/8) nodular plinthite; about 2 percent, by volume, ironstone pebbles 2 to 5 millimeters in size; very strongly acid; gradual smooth boundary.

B't—68 to 83 inches; mottled strong brown (7.5YR 5/6, 5/8), gray (10YR 6/1), yellowish brown (10YR 5/6), and red (10R 4/8) sandy clay loam; weak medium prismatic structure parting to moderate coarse subangular blocky; very firm, sticky and plastic; common thin patchy and few thick continuous clay films on faces of peds; about 2 percent, by volume, black concretions 4 to 8 millimeters in size; about 1 to 2 percent, by volume, nodular plinthite and few plates of plinthite; very strongly acid; gradual smooth boundary.

BCt—83 to 96 inches; mottled gray (10YR 6/1), dark red (10R 3/6), brownish yellow (10YR 6/8), and yellowish brown (10YR 5/6) sandy clay loam; moderate coarse subangular blocky structure; very hard, firm, sticky and plastic; common thin continuous clay films on faces of peds; few small pressure faces; very strongly acid.

The solum ranges from 60 to more than 80 inches in thickness. The depth to horizons in which the content of plinthite is more than 5 percent, by volume, is 25 to 60 inches. The content of ironstone pebbles 2 to 10 millimeters in diameter ranges from 0 to about 10 percent, by volume. The control section ranges from 20 to 35 percent clay. The combined thickness of the A and E horizons ranges from 8 to 20 inches.

The A horizon is dark grayish brown, grayish brown, dark brown, brown, yellowish brown, or dark yellowish brown. Reaction ranges from strongly acid to slightly acid in unlimed areas.

The E horizon is brown, pale brown, very pale brown, light yellowish brown, dark yellowish brown, or yellowish brown. The texture is very fine sandy loam or fine sandy loam. Reaction ranges from strongly acid to slightly acid in unlimed areas.

The upper part of the Bt horizon is yellowish brown, reddish yellow, brownish yellow, or strong brown. In some pedons it has few to many mottles in shades of red or brown. The texture is sandy clay loam, clay loam,

loam, or fine sandy loam. The content of clay ranges from 18 to 35 percent. Lenses of E material make up 0 to 4 percent of the volume. Reaction is very strongly acid or strongly acid.

The Btv and Btv/E horizons are yellowish brown, reddish yellow, brownish yellow, or strong brown. Few to many mottles in shades of red, brown, yellow, or gray may occur in these horizons, or the matrix may be mottled in these colors. The texture is sandy clay loam, clay loam, or loam. The content of clay ranges from 20 to 35 percent. Lenses or interfingers of E material make up 0 to 4 percent of the volume in the Btv horizon and may make up 5 to 15 percent of the volume in Btv/E horizon. Slightly brittle masses make up 0 to 15 percent of the volume. The content of nodular plinthite ranges from 5 to 15 percent, by volume. Reaction is very strongly acid or strongly acid.

The B't or BC horizon, if it occurs, has colors in shades of gray or brown or is mottled in shades of red or yellow. The texture is sandy clay loam, clay loam, or loam. Lenses or interfingers of E material make up 0 to 10 percent of the volume. Nodular plinthite makes up 0 to 4 percent of the volume. Reaction is very strongly acid or strongly acid.

Cart Series

The Cart series consists of very deep soils on stream terraces and terrace remnants 50 to 100 feet above the present streams. These soils are well drained and slowly permeable. They formed in loamy, windblown and alluvial sediments derived from the larger bayous and rivers. They are on circular or oval mounds in close association with Bonn, Erno, Guyton, and Metcalf soils, which are in nearly level areas between the mounds. Slopes range from 0 to 2 percent. The mounds are about 2 to 6 feet high and 40 to 200 feet across. The soils of the Cart series are coarse-loamy, siliceous, thermic Typic Fraglossudalfs.

Typical pedon of Cart very fine sandy loam, in an area of Erno-Cart complex, 0 to 2 percent slopes; from the intersection of U.S. Highways 59 and 80 in Marshall, 5.5 miles west on U.S. Highway 80, about 2.6 miles southwest on Farm Road 968, about 4.9 miles south on Farm Road 3251, about 1.95 miles west on Farm Road 2625, about 1.25 miles south on a county road, 0.25 mile south on a private oil field road, and 300 feet west in a pasture:

A—0 to 3 inches; dark yellowish brown (10YR 4/4) very fine sandy loam; weak medium granular structure; very friable; many fine and medium and few coarse roots; common very fine pores; very strongly acid; abrupt smooth boundary.

E1—3 to 11 inches; yellowish brown (10YR 5/4) very fine sandy loam; weak coarse subangular blocky structure parting to weak medium granular; very friable; common fine and medium and few coarse roots; common very fine and fine pores; very strongly acid; clear smooth boundary.

E2—11 to 22 inches; brown (7.5YR 5/4) very fine sandy loam; common medium faint strong brown (7.5YR 5/6) mottles; weak coarse subangular blocky structure parting to weak medium granular; very friable; common fine and medium roots; common very fine and fine pores; medium acid; gradual smooth boundary.

Bt/E1—22 to 28 inches; yellowish brown (10YR 5/6) loam; moderate medium subangular blocky structure; very friable; few fine and medium roots; common very fine and fine pores; about 25 percent, by volume, lenses, interfingers, and tongues of pale brown (10YR 6/3) material; common thin clay bridges between sand grains and few patchy clay films on faces of peds; medium acid; gradual smooth boundary.

Bt/E2—28 to 43 inches; strong brown (7.5YR 5/6) loam; moderate medium subangular blocky structure; friable; few fine and medium roots; common very fine and fine pores; about 5 percent, by volume, lenses and interfingers of pale brown (10YR 6/3) material; few thin patchy clay films on faces of peds and along pores; medium acid; clear smooth boundary.

Btx/E1—43 to 58 inches; yellowish brown (10YR 5/6) loam; common medium distinct strong brown (7.5YR 5/6) mottles; moderate very coarse prismatic structure parting to moderate medium subangular blocky; slightly brittle or moderately brittle and firm in about 60 percent of the matrix; few fine roots along faces of prisms in the E material; common very fine to coarse pores; about 5 percent, by volume, lenses and interfingers of pale brown (10YR 6/3) material; few thin patchy clay films on faces of peds and along pores; strongly acid; gradual wavy boundary.

Btx/E2—58 to 80 inches; brownish yellow (10YR 6/6) loam; common coarse prominent red (2.5YR 4/8), common coarse distinct strong brown (7.5YR 5/8), and few fine faint pale brown (10YR 6/3) mottles; moderate very coarse prismatic structure; moderately brittle and firm in about 75 percent of the matrix; very few fine roots along faces of prisms in the E material; common fine and medium pores; about 8 percent, by volume, lenses and interfingers of light brownish gray and pale brown (10YR 6/2, 6/3) material; few thin patchy clay films on faces of peds and along pores; very strongly acid.

The solum ranges from 60 to more than 80 inches in thickness. Depth to the fragipan is 40 to 57 inches. The combined thickness of the A and E horizons ranges from 20 to 40 inches.

The A horizon is dark yellowish brown, yellowish brown, brown, dark brown, dark grayish brown, or very dark grayish brown. Reaction ranges from very strongly acid to slightly acid in unlimed areas.

The E horizon is brown, pale brown, light yellowish brown, yellowish brown, or light brown. It has no mottles or has few or common mottles in shades of brown, yellow, or red. Some pedons have an EB horizon, which has chroma of 6. The texture is fine sandy loam, very fine sandy loam, or loam. Reaction ranges from very strongly acid to medium acid in unlimed areas.

The Bt/E horizon is strong brown, reddish yellow, yellowish brown, brownish yellow, or yellowish red. It has no mottles or has few or common mottles in shades of brown, yellow, or red. The texture is fine sandy loam, very fine sandy loam, or loam. The content of clay in the control section ranges from 10 to 18 percent, and the content of silt ranges from 20 to 50 percent. The upper part of the horizon is about 15 to 25 percent, by volume, tongues of E material. Other E material makes up 5 to 40 percent, by volume, of the matrix. Slightly brittle masses make up 0 to 40 percent of the matrix, by volume. Reaction generally is very strongly acid or strongly acid, but it ranges to medium acid.

The Btx/E1 horizon is strong brown, yellowish brown, brownish yellow, light yellowish brown, brown, light brown, or reddish yellow. It has few to many mottles in shades of brown, red, or gray. The texture is sandy clay loam, clay loam, loam, or fine sandy loam. The content of clay ranges from 15 to 26 percent. Interfingers and lenses of E material make up 3 to 10 percent, by volume, of the matrix. About 60 to 80 percent of the matrix is slightly brittle or moderately brittle. Nodules of plinthite make up 0 to 4 percent of the volume. Generally, many fine to coarse pores are throughout the horizon. Reaction is very strongly acid or strongly acid.

The Btx/E2 horizon has matrix colors in shades of red, brown, yellow, or gray. It is mottled with these colors. Some pedons have a mottled matrix with these colors. The texture is sandy clay loam, loam, or fine sandy loam. The content of clay ranges from 15 to 26 percent. Interfingers, lenses, or tongues of E material along vertical polygonal prisms make up 5 to 25 percent, by volume, of the matrix. About 60 to 90 percent of the matrix is moderately brittle or strongly brittle. Nodules of plinthite make up 0 to 4 percent of the volume. Many fine to coarse pores are throughout the horizon. Reaction is very strongly acid or strongly acid.

The fragipan commonly is underlain by a Bt/E′ or 2BC horizon. This horizon is characterized by an increase in content of clay. It has colors in shades of red, brown, yellow, or gray. It is mottled with these colors. Reaction is very strongly acid or strongly acid.

Cuthbert Series

The Cuthbert series consists of soils that are moderately deep over weakly consolidated sandstone on uplands. These soils are well drained and moderately slowly permeable. They formed in material weathered from interbedded sandstone and shale of the Reklaw and Weches Formations. Slopes range from 5 to 35 percent. The soils of the Cuthbert series are clayey, mixed, thermic Typic Hapludults.

Typical pedon of Cuthbert gravelly fine sandy loam, 5 to 15 percent slopes; from the intersection of U.S. Highways 59 and 80 in Marshall, 0.2 mile north on U.S. Highway 59, about 5.3 miles northeast on Texas Highway 43, about 2.6 miles north on a county road, 0.2 mile west on a private road, and 20 feet southwest in an area of woodland:

A—0 to 6 inches; very dark grayish brown (10YR 3/2) gravelly fine sandy loam; weak fine granular structure; soft, very friable; common fine, medium, and coarse roots; about 20 percent, by volume, ironstone pebbles 2 millimeters to 7 centimeters in size; very strongly acid; clear smooth boundary.

E—6 to 14 inches; light brown (7.5YR 6/4) gravelly fine sandy loam; weak medium granular structure; soft, very friable; common fine, medium, and coarse roots; about 20 percent, by volume, ironstone pebbles 2 millimeters to 7 centimeters in size; very strongly acid; gradual smooth boundary.

Bt1—14 to 23 inches; yellowish red (5YR 5/6) clay; few medium distinct brownish yellow (10YR 6/6) mottles; weak medium prismatic structure parting to moderate medium subangular blocky; very hard, firm; common fine, medium, and coarse roots; many thick clay films on faces of peds; about 3 percent, by volume, ironstone pebbles 2 millimeters to 2 centimeters in size; very strongly acid; gradual smooth boundary.

Bt2—23 to 30 inches; yellowish red (5YR 5/6) clay loam; common fine and medium distinct brownish yellow (10YR 6/6) mottles; moderate medium subangular blocky structure; hard, friable; few fine and medium roots; common thick clay films on faces of peds; extremely acid; gradual smooth boundary.

BCt—30 to 36 inches; mottled brownish yellow (10YR

6/6) and yellowish red (5YR 5/6) clay loam; weak medium subangular blocky structure; hard, friable; few fine and medium roots; few thick clay films on faces of peds; extremely acid; gradual smooth boundary.

C—36 to 60 inches; mottled brownish yellow (10YR 6/6), yellowish red (5YR 4/6), light gray (10YR 7/1), and strong brown (7.5YR 4/6), weakly consolidated sandstone and shaly material that has a texture of sandy clay loam; moderate medium platy structure; hard, friable, sticky and plastic; few fine roots; extremely acid.

The solum ranges from 20 to 40 inches in thickness. The control section ranges from 35 to 60 percent clay.

The A horizon is brown, dark brown, dark yellowish brown, dark grayish brown, very dark gray, or very dark grayish brown. The texture is fine sandy loam or gravelly fine sandy loam. Ironstone pebbles 2 millimeters to 7.5 centimeters in size make up 2 to 35 percent of the volume. In a few pedons a few scattered stones more than 10 inches across are on the surface. Reaction ranges from very strongly acid to slightly acid in unlimed areas.

The E horizon, if it occurs, is brown, yellowish brown, light brown, pale brown, or light yellowish brown. The texture is fine sandy loam or gravelly or very gravelly fine sandy loam. Ironstone pebbles 2 millimeters to 7.5 centimeters in size make up 2 to 50 percent of the volume. Reaction ranges from very strongly acid to slightly acid in unlimed areas.

The Bt horizon is dark red, red, or yellowish red. It has no mottles or has few or common mottles in shades of brown or yellow. Horizontally oriented shale fragments in shades of gray may occur in the lower part of the horizon. The texture is clay, clay loam, or sandy clay. The content of clay ranges from 35 to 60 percent. Reaction ranges from extremely acid to strongly acid.

The BC or B/C horizon, if it occurs, has colors in shades of red, brown, or yellow and is stratified or mottled with these colors and with shades of gray. The texture is sandy clay loam, clay loam, or fine sandy loam with or without weathered sandstone and shaly material. Reaction ranges from extremely acid to strongly acid.

The C horizon is stratified, weakly consolidated clay loam, sandy clay loam, fine sandy loam, and shaly clay and weakly cemented sandstone. The loamy material and sandstone have colors in shades of red, yellow, or brown. The clayey material generally has colors in shades of gray. Mica flakes are in the shaly material in some pedons. Discontinuous ironstone layers 1 to 4 inches thick are in some pedons. Reaction is extremely acid or very strongly acid.

Cypress Series

The Cypress series consists of very deep soils in lakebeds, old oxbows, and areas bordering stream channels. These soils are very poorly drained and very slowly permeable. They formed in clayey alluvium. Slopes are 0 to 1 percent. The soils of the Cypress series are fine, mixed, acid, thermic Typic Fluvaquents.

Typical pedon of Cypress clay loam, submerged; from the intersection of U.S. Highways 59 and 80 in Marshall, 0.2 mile north on U.S. Highway 59, about 14.0 miles northeast on Texas Highway 43, about 5.0 miles east on Farm Road 2198 to Uncertain, 0.7 mile north-northeast by boat, and 15 feet south on the north side of a stand of submerged baldcypress:

Oe—4 inches to 0; partially decomposed mat of organic material that includes cypress twigs, leaves, sticks, and roots; gradual wavy boundary.

Ag—0 to 6 inches; gray (5Y 5/1) clay loam; common fine distinct yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; friable; many fine, medium, and coarse roots; extremely acid; clear smooth boundary.

Cg1—6 to 20 inches; gray (10YR 5/1) clay; few fine distinct yellowish brown (10YR 5/8) mottles; massive; firm; common fine, medium, and coarse roots; extremely acid; gradual smooth boundary.

Cg2—20 to 60 inches; gray (N 6/0) clay; few fine prominent strong brown (7.5YR 5/8) mottles; massive; firm; few fine, medium, and coarse roots; extremely acid.

The solum is as much as 10 inches thick. The content of clay in the 10- to 40-inch control section is 35 to 50 percent. An apparent water table is about 4 feet to 1 foot above the surface during most of the year and 2 feet above to 1 foot below the surface during dry periods.

The O horizon consists of partially decomposed leaves, twigs, sticks, and roots.

The A horizon is dark gray, gray, light gray, or grayish brown. Few or common mottles in shades of brown or gray may occur in this horizon. The texture is clay loam, silty clay loam, or clay.

The C horizon is gray, light gray, or greenish gray. Few or common mottles in shades of brown, gray, or olive or in neutral colors may occur in this horizon. The texture is clay loam or clay.

Darbonne Series

The Darbonne series consists of very deep soils on slightly convex ridges and hilltops in the uplands. These soils are well drained and moderately slowly permeable.

They formed in loamy, iron-rich deposits of the Reklaw Formation and Queen City Sand (fig. 15). Slopes range from 3 to 5 percent. The soils of the Darbonne series are fine-loamy, siliceous, thermic Typic Paleudalfs.

Typical pedon of Darbonne fine sandy loam, 3 to 5 percent slopes; from the intersection of U.S. Highways 59 and 80 in Marshall, 1.5 miles south on U.S. Highway 59, about 1.3 miles west on Texas Highway 43, about 3.4 miles south on Roseborough Springs Road, 0.25 mile east on a private road, 0.1 mile southwest on a private road, and 50 feet east in a pine plantation:

A—0 to 6 inches; brown (10YR 5/3) fine sandy loam; moderate medium subangular blocky structure; friable; common fine and medium roots; common fine and few medium pores; about 7 percent, by volume, ironstone pebbles 5 to 15 millimeters in diameter; slightly acid; clear smooth boundary.

E—6 to 18 inches; light yellowish brown (10YR 6/4) fine sandy loam; moderate medium subangular blocky structure; friable; common fine and few medium roots; common fine and few medium pores; about 13 percent, by volume, ironstone pebbles 5 to 15 millimeters in diameter; medium acid; gradual wavy boundary.

BE—18 to 22 inches; strong brown (7.5YR 5/6) fine sandy loam; moderate medium subangular blocky structure; friable; common fine and few medium roots; common fine and few medium pores; about 12 percent, by volume, ironstone pebbles 5 to 15 millimeters in diameter; strongly acid; clear smooth boundary.

Bt1—22 to 33 inches; yellowish red (5YR 5/8) fine sandy loam; moderate medium subangular blocky structure; firm; few fine and medium roots; common fine and few medium pores; few thin patchy clay films on faces of peds; about 10 percent, by volume, ironstone pebbles 5 to 15 millimeters in diameter; strongly acid; clear smooth boundary.

Bt2—33 to 41 inches; strong brown (7.5YR 5/8) gravelly sandy clay loam; common fine distinct yellowish brown (10YR 5/6) and many medium distinct yellowish red (5YR 5/8) mottles; moderate medium subangular blocky structure; firm; few fine and medium roots; common fine and few medium pores; few thin patchy clay films on faces of peds; few thin skeletans on faces of peds; about 24 percent, by volume, ironstone pebbles 5 to 15 millimeters in diameter; strongly acid; clear smooth boundary.

Bt3—41 to 47 inches; mottled red (2.5YR 4/8), yellowish red (5YR 5/8), and brownish yellow (10YR 6/6) sandy clay loam; moderate medium subangular blocky structure; firm; few fine roots; common fine and medium and few coarse pores; few thin patchy clay films on faces of peds; few thin skeletans on faces of peds; about 10 percent, by volume, ironstone pebbles 5 to 15 millimeters in diameter; very strongly acid; clear smooth boundary.

BCt1—47 to 53 inches; brownish yellow (10YR 6/8) gravelly sandy clay loam; common medium prominent red (2.5YR 4/8) mottles; weak coarse subangular blocky structure; firm; few fine roots; common fine and few medium and coarse pores; common thick continuous clay films on faces of peds; common fine shale fragments; fractured ironstone layer, 6 to 50 millimeters thick, at a depth of about 51 inches; about 30 percent, by volume, ironstone pebbles 5 to 15 millimeters in diameter; very strongly acid; clear smooth boundary.

BCt2—53 to 80 inches; red (2.5YR 4/8) sandy clay loam; common fine distinct brownish yellow (10YR 6/6) and few fine prominent very pale brown (10YR 7/3) mottles; massive; firm; few fine roots; few fine pores; few thick continuous clay films on fracture faces; about 2 percent, by volume, ironstone gravel 5 to 15 millimeters in diameter; very strongly acid.

The solum ranges from 50 to more than 60 inches in thickness. The control section ranges from 20 to 35 percent clay. Ironstone fragments, mainly less than 1 inch across, make up 25 to 35 percent, by volume, of the control section. Some of the fragments are as much as 3 inches across, and a few are as much as 10 inches across.

The A horizon is brown, dark grayish brown, or dark brown. Ironstone pebbles 2 to 20 millimeters in diameter make up 2 to 20 percent of the volume. Reaction ranges from very strongly acid to slightly acid in unlimed areas.

The E horizon is light yellowish brown, yellowish brown, light brown, or brown. The texture is fine sandy loam or gravelly fine sandy loam. Ironstone pebbles 2 to 20 millimeters in diameter make up 5 to 25 percent of the volume. Reaction ranges from very strongly acid to medium acid.

The BE horizon, if it occurs, is light brown, reddish yellow, strong brown, or yellowish red. It has no mottles or has few mottles in shades of brown or pink. The texture is fine sandy loam, gravelly fine sandy loam, or very gravelly fine sandy loam. The content of ironstone pebbles 3 to 15 millimeters in diameter ranges, by volume, from 7 to 18 percent in the upper part of the horizon and from about 30 to 55 percent in the lower part. Reaction is very strongly acid or strongly acid.

The Bt horizon generally is strong brown, reddish yellow, yellowish red, or red. In some pedons, however, the lower part has a brownish yellow matrix. This horizon has no mottles or has few to many, fine or

medium mottles in shades of brown, red, or yellow. Some pedons have a mottled matrix with the same colors. The texture is sandy clay loam, gravelly sandy clay loam, very gravelly sandy clay loam, very gravelly fine sandy loam, clay loam, or gravelly clay loam. The content of clay ranges from 14 to 36 percent. The content of ironstone pebbles 3 to 15 millimeters in diameter ranges from 5 to 60 percent, by volume, and generally decreases with increasing depth. Some pedons have discontinuous or nearly continuous layers of fractured ironstone 4 to 75 millimeters thick. Reaction is very strongly acid or strongly acid.

The BC horizon, if it occurs, is brownish yellow, strong brown, reddish yellow, or red. It has no mottles or has few to many reddish mottles. Some pedons have a mottled matrix with the same colors. The texture is clay loam, sandy clay, or gravelly sandy clay loam. The content of ironstone pebbles 2 to 15 millimeters in diameter ranges from 0 to 16 percent, by volume. Reaction is very strongly acid or strongly acid.

The C horizon is red. Few or common, fine or medium mottles in shades of yellow or brown are in some pedons. Some pedons have a mottled matrix with the same colors. The texture is sandy clay loam, clay loam, or shaly clay loam. Strata of weakly consolidated sandstone and shale may occur in this horizon. Some pedons are weakly stratified with these materials. The content of ironstone pebbles 2 to 15 millimeters in diameter ranges from 0 to 5 percent, by volume. Reaction is very strongly acid.

Darco Series

The Darco series consists of very deep soils on uplands. These soils are somewhat excessively drained and moderately permeable. They formed in sandy and loamy deposits of Queen City Sand and Sparta Sand. Slopes range from 2 to 15 percent. The soils of the Darco series are loamy, siliceous, thermic Grossarenic Paleudults.

Typical pedon of Darco loamy fine sand, 2 to 5 percent slopes; from the intersection of U.S. Highways 59 and 80 in Marshall, 2.4 miles west on U.S. Highway 80, about 0.65 mile north on Loop 390, about 11.4 miles northwest on Texas Highway 154, about 1.7 miles east on Farm Road 2208 to a gate, 335 feet east along a fence, and 110 feet south in an area of woodland:

A—0 to 3 inches; dark grayish brown (10YR 4/2) loamy fine sand; weak fine granular structure; very friable; common fine and medium roots; very strongly acid; abrupt smooth boundary.

E1—3 to 8 inches; brown (10YR 5/3) loamy fine sand; weak fine granular structure; very friable; common fine and medium roots; strongly acid; clear smooth boundary.

E2—8 to 66 inches; light yellowish brown (10YR 6/4) loamy fine sand; weak coarse subangular blocky structure; very friable; few fine roots; slightly acid; gradual smooth boundary.

Bt/E1—66 to 80 inches; strong brown (7.5YR 5/6) sandy clay loam; common medium prominent (2.5YR 4/8) mottles; moderate coarse subangular blocky structure; friable; about 8 percent, by volume, light yellowish brown (10YR 6/4) lenses and interfingers of E material; about 2 percent, by volume, red (2.5YR 4/6) nodular plinthite; common thin patchy clay films on faces of peds; strongly acid; gradual smooth boundary.

Bt/E2—80 to 90 inches; yellowish brown (10YR 5/6) sandy clay loam; common medium distinct strong brown (7.5YR 5/6) and common medium prominent yellowish red (5YR 5/6) mottles; weak coarse subangular blocky structure; friable; about 12 percent, by volume, light yellowish brown (10YR 6/4) E material occurring as lenses and interfingers; about 1 percent, by volume, red (2.5YR 4/6) nodular plinthite; common thin patchy clay films on faces of peds; very strongly acid.

The solum is more than 80 inches thick. The combined thickness of the A and E horizons ranges from 40 to 72 inches.

The A horizon is dark grayish brown, grayish brown, dark brown, or brown. Reaction ranges from very strongly acid to slightly acid in unlimed areas.

The E horizon is brown, very pale brown, pale brown, light yellowish brown, or yellowish brown. Reaction ranges from very strongly acid to slightly acid.

The Bt/E or Bt horizon is red, yellowish red, strong brown, or yellowish brown, or it is mottled in these colors. Mottles in shades of brown or red occur in most pedons, and mottles with chroma of 2 or less may occur below a depth of 50 inches. The texture is fine sandy loam or sandy clay loam. The content of clay ranges from 15 to 35 percent. Lenses or interfingers of E material make up 0 to 15 percent of the volume. Nodular plinthite makes up 0 to 4 percent of the volume. Reaction is very strongly acid or strongly acid.

Darden Series

The Darden series consists of very deep soils on uplands. These soils are excessively drained and rapidly permeable. They formed in sandy deposits of Queen City Sand and Carrizo Sand. Slopes range from 1 to 15 percent. The soils of the Darden series are thermic, coated Typic Quartzipsamments.

Typical pedon of Darden fine sand, 1 to 5 percent slopes; from the intersection of U.S. Highways 59 and 80 in Marshall, 2.4 miles west on U.S. Highway 80, about 0.65 mile north on Loop 390, about 11.7 miles northwest on Texas Highway 154, about 0.15 mile northwest on Farm Road 450, about 1.25 miles north on Farm Road 1968, about 2.7 miles east and 0.3 mile south on a county road, and 75 feet west in a native pasture:

A—0 to 10 inches; dark yellowish brown (10YR 4/4) fine sand; weak medium granular structure; very friable; common fine and medium roots; very strongly acid; gradual wavy boundary.

E—10 to 19 inches; light yellowish brown (10YR 6/4) fine sand; few fine distinct strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure parting to weak medium granular; very friable; few fine and medium roots; very strongly acid; gradual wavy boundary.

Bw1—19 to 40 inches; strong brown (7.5YR 5/6) loamy fine sand; weak medium subangular blocky structure parting to weak medium granular; very friable; few fine roots; few thin lenses of uncoated very pale brown (10YR 7/4) sand; very strongly acid; gradual wavy boundary.

Bw2—40 to 70 inches; strong brown (7.5YR 5/8) loamy fine sand; weak medium subangular blocky structure parting to weak medium granular; very friable; few fine roots; few thin lenses of uncoated very pale brown (10YR 7/4) sand; very strongly acid; gradual wavy boundary.

Bw/E—70 to 80 inches; strong brown (7.5YR 5/8) loamy fine sand (Bw); weak coarse subangular blocky structure; very friable; about 8 percent, by volume, lenses of uncoated very pale brown (10YR 7/4) sand (E); few thin broken threads of yellowish red (5YR 5/8) lamellae (Bw); very strongly acid.

The sandy material is more than 80 inches thick. The 10- to 40-inch control section has 10 to 25 percent silt plus clay. A few discontinuous lamellae may occur below a depth of 40 inches.

The A horizon is dark yellowish brown, yellowish brown, brown, dark brown, or pale brown. Reaction ranges from very strongly acid to slightly acid in unlimed areas.

The E horizon is light yellowish brown, yellowish brown, very pale brown, light brown, or brown. The texture is fine sand or loamy fine sand. Reaction ranges from very strongly acid to slightly acid in unlimed areas.

The Bw or Bw/E horizon is reddish yellow, light brown, strong brown, yellowish brown, or brownish yellow. The E material in the Bw/E horizon makes up 0 to 50 percent of the volume. Reaction ranges from very strongly acid to slightly acid.

The E/Bw or E′ horizon, if it occurs, is light brown, very pale brown, pink, light gray, or brown. It has common, few, or no discontinuous lamellae, which are yellowish red or strong brown. Reaction ranges from very strongly acid to slightly acid.

Eastwood Series

The Eastwood series consists of soils that are deep over weakly consolidated siltstone on uplands. These soils are moderately well drained and very slowly permeable. They formed in shaly clay deposits of the Wilcox Group. Slopes range from 1 to 20 percent. The soils of the Eastwood series are fine, montmorillonitic, thermic Vertic Hapludalfs.

Typical pedon of Eastwood very fine sandy loam, 1 to 5 percent slopes; from the intersection of U.S. Highways 59 and 80 in Marshall, 11.2 miles east on U.S. Highway 80, about 0.1 mile south on overpass across Interstate 20 and 1.75 miles east on a service road, 2.0 miles south on Strickland Springs Road, 300 feet east along a pipeline, and 25 feet north in a plantation of loblolly pine:

A—0 to 3 inches; dark yellowish brown (10YR 4/4) very fine sandy loam; weak medium granular structure; very friable; many fine and medium roots; common fine and medium pores; very strongly acid; clear smooth boundary.

EB—3 to 8 inches; light yellowish brown (10YR 6/4) and strong brown (7.5YR 5/6) very fine sandy loam; weak medium subangular blocky structure; very friable; common fine, medium, and coarse roots; moderate fine and medium pores; few fine black concretions; very strongly acid; clear wavy boundary.

Bt1—8 to 12 inches; red (2.5YR 4/6) clay; moderate fine subangular blocky structure; very firm; common fine, medium, and coarse roots; few very fine pores; common thin clay films on faces of peds; very strongly acid; clear wavy boundary.

Bt2—12 to 17 inches; red (2.5YR 4/6) clay; few fine prominent light brownish gray (2.5Y 6/2 and 10YR 6/2) mottles, mainly along root channels; moderate medium prismatic structure parting to weak medium subangular blocky; very firm; common fine, medium, and coarse roots; few fine pores; common thin clay films on faces of prisms; very strongly acid; clear wavy boundary.

Bt3—17 to 23 inches; red (2.5YR 4/6) clay; common medium prominent light brownish gray (2.5Y 6/2) mottles, mainly along root channels; moderate medium prismatic structure parting to moderate

medium subangular blocky; very firm; few fine, medium, and coarse roots; few fine pores; common thin clay films on faces of prisms; few fine pressure faces; very strongly acid; gradual wavy boundary.

Bt4—23 to 28 inches; red (2.5YR 4/8) silty clay; many medium prominent light gray (10YR 7/2) mottles; moderate medium prismatic structure parting to moderate coarse subangular blocky; very firm; few fine roots; few very fine pores; common thin clay films on faces of prisms; common fine pressure faces; few small intersecting slickensides; very strongly acid; clear smooth boundary.

Bt5—28 to 37 inches; yellowish brown (10YR 5/6) silty clay; common medium prominent red (2.5YR 5/6) and common medium distinct light brownish gray (2.5Y 6/2) mottles; weak medium and coarse prismatic structure parting to weak medium subangular blocky; very firm; few fine and medium roots; few very fine pores; common thin clay films on faces of prisms; common pressure faces; few small intersecting slickensides; few fine white masses of barite; very strongly acid; clear smooth boundary.

Bt6—37 to 46 inches; light yellowish brown (2.5Y 6/4) silty clay loam; common medium faint light brownish gray (2.5Y 6/2) and few fine faint brownish yellow (10YR 6/6) mottles; weak medium subangular blocky structure; firm; few fine and medium roots; few fine pores; few pressure faces; common thin clay films on faces of some peds; about 2 percent, by volume, fine white masses of barite; very strongly acid; clear smooth boundary.

BC—46 to 51 inches; yellowish brown (10YR 5/4) loam; common medium faint light brownish gray (2.5Y 6/2) and few medium faint yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure parting to weak medium platy; friable; few fine roots; few fine pores; few thin patchy clay films on faces of some peds; about 1 percent, by volume, white masses of barite; few root channels filled with yellowish brown and red clayey material from the horizons above; very strongly acid; clear smooth boundary.

C—51 to 72 inches; light yellowish brown (2.5Y 6/4), weakly consolidated siltstone that has a texture of silty clay loam; common fine distinct brownish yellow (10YR 6/6) mottles; moderate thin bedding planes; friable; few fine roots in the upper part; few fine white masses of barite; common fine black stains in the upper part; neutral.

The solum ranges from 40 to 60 inches in thickness. The control section ranges from 40 to 60 percent clay.

The A horizon is grayish brown, dark grayish brown, brown, dark brown, light yellowish brown, or dark yellowish brown. Reaction ranges from very strongly acid to medium acid in unlimed areas.

The E or EB horizon, if it occurs, is pale brown, light yellowish brown, yellowish brown, brown, or strong brown. The texture is fine sandy loam, very fine sandy loam, silt loam, or loam. Reaction ranges from very strongly acid to medium acid in unlimed areas.

The Bt horizon is yellowish red, reddish brown, red, or dark red in the upper part and brownish yellow, yellowish brown, dark yellowish brown, very pale brown, light brownish gray, grayish brown, light yellowish brown, reddish yellow, or strong brown in the lower part. Few to many, fine to coarse mottles in shades of gray, brown, yellow, or red may occur in this horizon. Some pedons have a mottled matrix with these colors. The texture is clay or silty clay in the upper part of the horizon and clay, silty clay, silty clay loam, or clay loam in the lower part. The content of clay ranges from 40 to 65 percent in the upper part and from 35 to 60 percent in the lower part. Reaction ranges from extremely acid to medium acid.

The BC horizon, if it occurs, is light gray, light brownish gray, grayish brown, yellowish brown, dark yellowish brown, or pale olive. It has no mottles or has few to many, fine or medium mottles in shades of brown, gray, yellow, or red. Some pedons have a mottled matrix with these colors. The texture is loam, sandy clay loam, clay loam, or silty clay loam. Reaction ranges from extremely acid to slightly acid.

The C horizon is light gray, light brownish gray, light yellowish brown, yellowish brown, or dark gray. It has no mottles or has few or common, fine or medium mottles in shades of yellow, brown, or gray. Some pedons have a mottled matrix with these colors. The weakly consolidated siltstone has a texture of fine sandy loam, loam, silt loam, silty clay loam, or clay loam. Bedding planes are evident. Reaction ranges from very strongly acid to neutral.

Elrose Series

The Elrose series consists of very deep soils on interstream divides in the uplands. These soils are well drained and moderately permeable. They formed in loamy marine deposits (fig. 16). Slopes range from 1 to 3 percent. The soils of the Elrose series are fine-loamy, siliceous, thermic Typic Paleudalfs.

Typical pedon of Elrose fine sandy loam, 1 to 3 percent slopes; from the intersection of U.S. Highways 59 and 80 in Marshall, 16.8 miles east on U.S. Highway 80, about 10.45 miles north on Farm Road 9, about 0.15 mile west on a private road, and 0.05 mile south in a pasture:

Ap—0 to 5 inches; brown (7.5YR 4/4) fine sandy loam; weak very fine subangular blocky structure parting to weak fine granular; friable; many fine and few medium roots; slightly acid; clear smooth boundary.

E—5 to 11 inches; brown (7.5YR 5/4) fine sandy loam; common medium distinct strong brown (7.5YR 4/6) mottles; weak medium subangular blocky structure; friable; common fine and few medium roots; neutral; clear smooth boundary.

Bt1—11 to 19 inches; yellowish red (5YR 5/6) loam; moderate coarse prismatic structure parting to moderate fine subangular blocky; friable; common fine and few medium roots; few thin continuous clay films on faces of prisms and few thin patchy clay films on faces of the smaller peds; neutral; gradual smooth boundary.

Bt2—19 to 28 inches; red (2.5YR 4/6) clay loam; moderate coarse prismatic structure parting to moderate fine subangular blocky; friable; few fine and few medium roots; few thin patchy clay films on faces of peds; slightly acid; gradual smooth boundary.

Bt3—28 to 36 inches; red (2.5YR 4/6) clay loam; few fine distinct brownish yellow (10YR 6/6) mottles; moderate coarse prismatic structure parting to moderate fine subangular blocky; friable; few fine and medium roots; few thin patchy clay films on faces of peds; few very fine ironstone pebbles; medium acid; gradual smooth boundary.

Bt4—36 to 44 inches; red (2.5YR 4/6) clay loam; common fine and medium distinct brownish yellow (10YR 6/6) mottles; weak medium prismatic structure parting to moderate fine subangular blocky; friable; few fine roots; common thin patchy clay films on faces of peds; common fine and medium ironstone pebbles; few fine to very coarse petrified wood fragments; medium acid; gradual smooth boundary.

Bt5—44 to 55 inches; red (2.5YR 4/6) clay; common fine and medium distinct brownish yellow (10YR 6/6) mottles; moderate medium prismatic structure parting to moderate medium angular blocky; firm; very few fine roots; common thin continuous clay films on faces of peds; medium acid; gradual smooth boundary.

Bt6—55 to 69 inches; red (2.5YR 4/6) clay; common fine and medium distinct brownish yellow (10YR 6/6) and few fine distinct light yellowish brown (10YR 6/4) mottles; moderate medium prismatic structure parting to moderate medium angular blocky; firm; very few fine roots; common thin continuous clay films in pores; few thin discontinuous sand coatings along vertical faces of some peds; medium acid; gradual smooth boundary.

Bt7—69 to 85 inches; red (2.5YR 4/6) clay; common coarse distinct brownish yellow (10YR 6/6) and common fine distinct light yellowish brown (10YR 6/4) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; few fine roots; common thin continuous clay films on faces of peds; few thin discontinuous sand coatings along vertical faces of some peds; thin, mainly continuous ironstone seam following a bedding plane in the lower part; strongly acid.

The thickness of the solum ranges from 60 to more than 80 inches. The solum has 0 to 10 percent, by volume, fragments of petrified wood, fossilized shells, or ironstone pebbles, mainly less than 6 inches across. Sand and silt coatings make up 0 to 4 percent, by volume, of the lower part of the argillic horizon. The average content of clay in the control section ranges from 18 to 35 percent. Base saturation 50 inches below the top of the argillic horizon ranges from 35 to 80 percent. The depth to a layer that has a clay content of more than 35 percent ranges from 28 to 50 inches. The content of clay does not decrease by 20 percent from the maximum between the surface and a depth of 60 inches. The depth to a clayey 2BC horizon is more than 80 inches.

The A horizon is dark grayish brown, brown, dark brown, or pale brown. Reaction ranges from very strongly acid to slightly acid in unlimed areas.

The E or EB horizon, if it occurs, is brown, light brown, pale brown, light yellowish brown, or yellowish brown. The texture is mainly fine sandy loam but ranges to loamy fine sand. Reaction ranges from very strongly acid to slightly acid in unlimed areas.

The Bt1 and Bt2 horizons are reddish brown, red, dark red, or yellowish red. They have no mottles or have few or common mottles in shades of red, yellow, or brown. The texture is loam, clay loam, or sandy clay loam. The content of clay ranges from 18 to 35 percent. Reaction ranges from very strongly acid to slightly acid.

The Bt3, Bt4, and Bt5 horizons are red or dark red. They have no mottles or have few or common mottles in shades of red, yellow, or brown. The texture is clay loam, clay, or sandy clay. The content of clay ranges from 35 to 45 percent. Reaction ranges from very strongly acid to slightly acid.

The Bt6 and Bt7 horizons, if they occur, are red, yellowish red, reddish yellow, or light red. They have no mottles or have few or common mottles in shades of red, yellow, or brown. The texture is sandy clay loam, clay loam, sandy clay, or clay. The content of clay

ranges from 22 to 45 percent. Reaction ranges from very strongly acid to slightly acid.

Some pedons have a 2BC horizon. This horizon is red. It has common or many mottles in shades of yellow, brown, or gray. Some pedons have a mottled matrix with the same colors. The texture is silty clay or clay. This horizon has few or no small pressure faces and slickensides. Reaction is very strongly acid or strongly acid.

Erno Series

The Erno series consists of very deep soils on stream terraces and terrace remnants. These soils are well drained and slowly permeable. They formed in loamy alluvial sediments derived from the larger bayous and rivers. They are between mounds in close association with the mounded Cart soils. Slopes range from 0 to 2 percent. The soils of the Erno series are fine-loamy, siliceous, thermic Typic Fragiudalfs.

Typical pedon of Erno very fine sandy loam, in an area of Erno-Cart complex, 0 to 2 percent slopes; from the intersection of U.S. Highways 59 and 80 in Marshall, 5.5 miles west on U.S. Highway 80, about 2.6 miles southwest on Farm Road 968, about 4.9 miles south on Farm Road 3251, about 1.95 miles west on Farm Road 2625, about 1.25 miles south on a county road, 0.25 mile south on a private oil field road, and 325 feet south in a pasture:

Ap—0 to 4 inches; grayish brown (10YR 5/2) very fine sandy loam; weak medium subangular blocky structure; very friable; many fine and medium roots; common fine pores; very strongly acid; abrupt smooth boundary.

E—4 to 9 inches; brown (10YR 5/3) very fine sandy loam; massive; very friable; common fine and few medium roots; few fine and medium pores; very strongly acid; clear smooth boundary.

Bt1—9 to 15 inches; strong brown (7.5YR 5/6) loam; weak coarse prismatic structure parting to moderate medium subangular blocky; friable; common fine and few medium roots; common fine and medium pores; few thin patchy clay films on faces of peds; about 2 percent, by volume, lenses of E material along faces of peds; strongly acid; clear smooth boundary.

Bt2—15 to 26 inches; strong brown (7.5YR 5/6) clay loam; few fine faint brownish yellow (10YR 6/6) and few fine distinct yellowish red (5YR 5/6) mottles; moderate coarse prismatic structure parting to moderate fine subangular blocky; friable; common fine and few medium roots; common fine and medium pores; common thin patchy clay films on faces of peds and in pores; few fine black concretions; medium acid; clear smooth boundary.

Bt3—26 to 36 inches; yellowish brown (10YR 5/6) loam; common medium distinct yellowish red (5YR 5/6) mottles; moderate medium prismatic structure parting to moderate fine subangular blocky; friable; common fine and few medium roots; common fine and medium pores; common thin patchy strong brown (7.5YR 5/6) clay films on faces of peds and in pores; few thin uncoated pale brown (10YR 6/3) sand grains along vertical faces of peds; strongly acid; gradual wavy boundary.

Btx—36 to 50 inches; yellowish brown (10YR 5/6) loam; common medium prominent red (2.5YR 4/8) mottles; moderate very coarse prismatic structure parting to moderate medium and coarse subangular blocky; moderately brittle in about 60 percent of the matrix; few fine and medium roots; many fine and medium pores; common medium continuous dark yellowish brown (10YR 4/4) clay films on faces of peds and in pores; about 2 to 4 percent, by volume, light yellowish brown (10YR 6/4) lenses and interfingers of clean sand grains; about 1 percent, by volume, red (2.5YR 4/8) nodular plinthite; about 1 percent, by volume, ironstone pebbles; strongly acid; gradual wavy boundary.

Btx/E1—50 to 68 inches; yellowish brown (10YR 5/6) loam (Btx); common medium prominent red (2.5YR 5/8) and few fine and medium faint brownish yellow (10YR 6/6) mottles; moderate very coarse prismatic structure parting to weak coarse subangular blocky; moderately brittle in about 80 to 90 percent of the matrix; few fine roots along faces of peds; common fine and medium and few coarse pores; common medium continuous strong brown (7.5YR 5/6) clay films on faces of peds and in pores; about 5 percent, by volume, very pale brown (10YR 7/3) interfingers of E material 2 to 5 millimeters thick and 18 inches long; about 1 percent, by volume, red (2.5YR 4/8) nodular plinthite; about 1 percent, by volume, ironstone pebbles; strongly acid; gradual wavy boundary.

Btx/E2—68 to 75 inches; yellowish brown (10YR 5/6) loam (Btx); common fine prominent red (2.5YR 5/8) and few fine and medium distinct grayish brown (10YR 5/2) mottles; moderate coarse prismatic structure parting to weak coarse subangular blocky; moderately brittle in about 80 to 90 percent of the matrix; few fine roots along prisms; many fine and few medium and coarse pores; few fine patchy clay films on vertical faces of peds; about 7 to 10 percent, by volume, light gray (10YR 7/2) interfingers and tongues of E material; less than 1 percent, by volume, red (2.5YR 5/8) nodular

plinthite; strongly acid; gradual wavy boundary.

Btx/E3—75 to 88 inches; yellowish brown (10YR 5/6) very fine sandy loam (Btx); common fine and medium faint brownish yellow (10YR 6/6) and few fine and medium distinct light brownish gray (10YR 6/2) mottles; moderate very coarse prismatic structure; strongly brittle in about 80 to 90 percent of the matrix; few fine roots along faces of prisms; many fine, medium, and coarse pores; few patchy clay films on faces of prisms directly behind the E material; about 10 to 12 percent, by volume, light gray (10YR 7/2) tongues and interfingers of E material; few fine ironstone pebbles; very strongly acid.

The solum ranges from 60 to more than 80 inches in thickness. Depth to the fragipan is 25 to 40 inches. The combined thickness of the A and E horizons is less than 20 inches.

The A horizon is grayish brown, dark grayish brown, brown, dark brown, yellowish brown, or dark yellowish brown. Reaction ranges from very strongly acid to slightly acid in unlimed areas.

The E horizon is light brownish gray, grayish brown, pale brown, brown, yellowish brown, light yellowish brown, or light brown. It has no mottles or has few or common mottles in shades of brown or yellow. Reaction ranges from very strongly acid to slightly acid in unlimed areas.

The Bt horizon is yellowish brown, light yellowish brown, strong brown, yellowish red, or reddish yellow. It has no mottles or has few or common mottles in shades of brown, red, or yellow. The texture is loam, fine sandy loam, clay loam, or sandy clay loam. The content of clay in the control section ranges from 18 to 35 percent, the content of silt ranges from 20 to 50 percent, and the content of sand coarser than very fine sand is more than 15 percent. Lenses of E material make up 0 to 5 percent, by volume, of the matrix. Reaction ranges from very strongly acid to medium acid.

The Btx horizon is yellowish brown, brownish yellow, light yellowish brown, or strong brown. It has few to many mottles in shades of brown, yellow, red, or gray. In some pedons it has a mottled matrix with these colors in the lower part. The texture is loam, clay loam, fine sandy loam, or sandy clay loam. The content of clay ranges from 19 to 30 percent. Lenses or interfingers of E material make up 2 to 10 percent, by volume, of the matrix in the upper part of the horizon, and interfingers or tongues of E material make up 5 to 15 percent of the matrix in the lower part. About 60 to 80 percent of the matrix is slightly brittle or moderately brittle in the upper part, and 60 to 95 percent of the matrix is moderately brittle or strongly brittle in the lower part. Nodules of plinthite make up 0 to 4 percent of the volume. Common or many, fine to coarse pores are throughout the horizon. Reaction is very strongly acid or strongly acid.

The fragipan commonly is underlain by a Bt/E or 2BC horizon. This horizon generally is characterized by an increase in content of clay. It has colors in shades of red, brown, yellow, or gray. It is mottled with these colors. Reaction is very strongly acid or strongly acid.

Estes Series

The Estes series consists of very deep soils on flood plains. These soils are somewhat poorly drained and very slowly permeable. They formed in clayey alluvium along the Sabine River. Slopes are 0 to 1 percent. The soils of the Estes series are fine, montmorillonitic, acid, thermic Aeric Fluvaquents.

Typical pedon of Estes clay, occasionally flooded; from the junction of U.S. Highways 59 and 80 in Marshall, 15.7 miles southwest on U.S. Highway 59 and 100 feet southeast in an area of woodland:

A—0 to 4 inches; dark brown (10YR 4/3) clay; moderate fine and medium subangular blocky structure; friable; many fine, medium, and coarse roots; extremely acid; clear wavy boundary.

Bw—4 to 12 inches; pale brown (10YR 6/3) clay; many fine and medium prominent yellowish red (5YR 5/6) mottles; moderate fine and medium subangular blocky structure; firm; common fine and medium roots; few fine and medium pores; few thin discontinuous clay films on faces of peds; extremely acid; clear smooth boundary.

Bg1—12 to 38 inches; light brownish gray (10YR 6/2) clay; common fine and medium prominent yellowish red (5YR 5/8) mottles; weak medium and coarse subangular blocky structure; firm; few fine and medium roots; few fine pores; few thin discontinuous clay films on faces of peds; few lenses of gray (10YR 7/1) clean sand on vertical faces of peds, mainly in the lower part; extremely acid; gradual smooth boundary.

2Bg2—38 to 65 inches; light brownish gray (10YR 6/2) clay; many medium distinct strong brown (7.5YR 5/8), many medium distinct yellowish brown (10YR 5/8), and common coarse prominent red (2.5YR 4/6) mottles; weak coarse subangular blocky structure; very firm; few fine roots; common fine pores; few pressure faces; few threads of white salts in the lower part; extremely acid; gradual smooth boundary.

BCg—65 to 80 inches; light brownish gray (10YR 6/2) clay loam; common medium distinct brownish yellow

(10YR 6/6) and many coarse prominent red (2.5YR 4/6) mottles; weak coarse subangular blocky structure; firm; few fine roots; few threads of white barite salts; extremely acid.

The solum ranges from 60 to more than 80 inches in thickness. The upper 40 inches is clay loam, silty clay loam, silty clay, or clay. The control section ranges from 35 to 53 percent clay.

The A horizon is very dark grayish brown, dark grayish brown, dark brown, brown, or grayish brown. It has no mottles or has few or common mottles in shades of gray or brown. Reaction ranges from extremely acid to medium acid.

The Bw horizon, if it occurs, is brown, dark brown, light yellowish brown, pale brown, dark yellowish brown, or yellowish brown. It has few to many mottles in shades of gray or brown. Some pedons have a mottled matrix with these colors. Reaction ranges from extremely acid to strongly acid.

The Bg1 horizon is dark grayish brown, dark gray, grayish brown, or gray. It has few to many mottles in shades of gray, brown, red, or yellow. It has few or no pressure faces or small slickensides. Reaction is extremely acid or very strongly acid.

The lower part of the Bg horizon is dark gray, dark grayish brown, grayish brown, light brownish gray, gray, or light gray. It has few to many mottles in shades of gray, brown, red, or yellow. The texture is clay or silty clay below a depth of 40 inches. Reaction is extremely acid or very strongly acid. Some pedons have threads, films, masses, or crystals of salts (gypsum or barite) below the control section. There are few or no pressure faces or small slickensides.

The BC horizon is light gray, light brownish gray, or gray. It has few to many mottles in shades of brown, yellow, or red. The texture is clay loam, silty clay loam, or sandy clay loam. Reaction ranges from extremely acid to strongly acid.

The C horizon, if it occurs, is stratified with loamy and clayey material in shades of brown or gray with or without yellowish or reddish colors. Reaction ranges from very strongly acid to medium acid.

Guyton Series

The Guyton series consists of very deep soils on stream terraces. These soils are poorly drained and slowly permeable. They formed in sandy and loamy alluvium. Slopes are 0 to 1 percent. The soils of the Guyton series are fine-silty, siliceous, thermic Typic Glossaqualfs.

Typical pedon of Guyton silt loam, in an area of Guyton-Cart complex, 0 to 1 percent slopes; from the junction of U.S. Highways 59 and 80 in Marshall, 14.2 miles east on U.S. Highway 80, about 0.9 mile north on Jonesville Road, 0.45 mile west and north on a county road (Bellview), and 45 feet east in an area of woodland:

A—0 to 2 inches; dark grayish brown (10YR 4/2) silt loam; common fine distinct yellowish brown (10YR 5/8) mottles; weak medium subangular blocky structure; very friable; many fine and medium roots; few fine and medium pores; extremely acid; clear smooth boundary.

E1—2 to 9 inches; light brownish gray (10YR 6/2) silt loam; few fine distinct yellowish brown (10YR 5/8) and few fine prominent yellowish red (5YR 4/6 and 4/8) mottles; moderate medium subangular blocky structure; very friable; common fine and few medium roots; few fine and medium pores; extremely acid; clear smooth boundary.

E2—9 to 17 inches; light brownish gray (10YR 6/2) silt loam; few fine distinct yellowish brown (10YR 5/8) and few fine distinct brownish yellow (10YR 6/8) mottles; moderate medium subangular blocky structure; very friable; few fine and few medium roots; few fine and medium pores; extremely acid; clear wavy boundary.

Btg/E1—17 to 29 inches; light brownish gray (10YR 6/2) silty clay loam; few fine prominent yellowish brown (10YR 5/8) and few fine prominent yellowish red (5YR 5/8) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; few fine, medium, and coarse roots; few fine, medium, and coarse pores; few moderately thick continuous clay films on vertical faces of peds; about 30 percent, by volume, E material occurring as lenses, interfingers, and tongues on vertical faces of peds; extremely acid; clear wavy boundary.

Btg/E2—29 to 39 inches; light brownish gray (10YR 6/2) silty clay loam; many medium faint pale brown (10YR 6/3) and few fine distinct yellowish brown (10YR 5/8) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; few fine and medium roots; few fine and medium pores; few moderately thick continuous clay films on vertical faces of peds; about 20 percent, by volume, E material occurring as lenses, interfingers, and tongues on vertical faces of peds; extremely acid; clear wavy boundary.

Btg—39 to 58 inches; light gray (10YR 7/1) loam; few fine distinct strong brown (7.5YR 5/8) mottles; moderate medium prismatic structure parting to weak medium subangular blocky; firm; few fine roots; few fine pores; common moderately thick

continuous clay films on vertical faces of peds; about 3 to 5 percent, by volume, E material occurring as lenses on vertical faces of peds; few fine black films on faces of peds and in root channels; very strongly acid; clear wavy boundary.

BC—58 to 72 inches; light gray (10YR 7/2) loam; few fine distinct reddish yellow (7.5YR 6/8) and few fine faint light yellowish brown (10YR 6/4) mottles; weak coarse prismatic structure parting to weak coarse subangular blocky; firm; few fine roots; few fine pores; few thin patchy clay films on vertical faces of peds; about 2 percent, by volume, E material occurring as lenses on vertical faces of peds; few fine black soft masses; strongly acid; clear wavy boundary.

C—72 to 80 inches; light brownish gray (10YR 6/2) loam; common fine distinct yellow (10YR 7/6) and few fine distinct strong brown (7.5YR 5/8) mottles; massive; very friable; few fine pores; medium acid.

The solum ranges from 50 to more than 80 inches in thickness. The control section ranges from 18 to 35 percent clay.

The A horizon is dark grayish brown, grayish brown, or brown. It has no mottles or has few or common, fine or medium mottles in shades of yellow, red, brown, or gray. Reaction ranges from extremely acid to medium acid in unlimed areas.

The E horizon is light brownish gray, grayish brown, or pale brown. Few or common, fine or medium mottles in shades of brown, yellow, or red may occur in this horizon. The texture is silt loam, loam, or very fine sandy loam. Reaction ranges from extremely acid to medium acid in unlimed areas.

The Btg/E horizon is light brownish gray, grayish brown, dark grayish brown, gray, or light gray. It has no mottles or has few to many, fine or medium mottles in shades of brown, yellow, red, or gray. The texture is silty clay loam, silt loam, loam, or clay loam. The content of clay ranges from 16 to 34 percent. Pockets, lenses, interfingers, tongues, and coatings of E material along faces of peds make up 5 to 35 percent of the volume. They are light brownish gray or light gray. They are 5 to 20 millimeters wide and 40 to 200 millimeters long. Soft black masses make up 0 to 3 percent of the volume. Reaction ranges from extremely acid to neutral.

The Btg horizon is light gray or light brownish gray. Few or common, fine or medium mottles in shades of brown or red may occur in this horizon. The texture is loam or clay loam. The content of clay ranges from 24 to 31 percent. Pockets, lenses, interfingers, and coatings of E material along faces of peds make up 1 to 4 percent of the volume. They are light brownish gray or light gray. Soft black masses make up 0 to 2 percent of the volume. Threads and crystals of barite make up 0 to 7 percent of the volume. Reaction ranges from very strongly acid to neutral.

The BC horizon is light gray or light brownish gray. Few to many, fine or medium mottles in shades of brown or yellow may occur in this horizon. The texture is loam or fine sandy loam. Pockets, lenses, interfingers, and coatings of E material along faces of peds make up 0 to 2 percent of the volume. Soft black masses make up 0 to 2 percent of the volume. Reaction ranges from strongly acid to neutral.

The C horizon, if it occurs, is light brownish gray, grayish brown, or light gray. Few to many, fine or medium mottles in shades of yellow, brown, or red may occur in this horizon. The texture is loam, fine sandy loam, or very fine sandy loam. Some pedons are stratified. Threads and crystals of barite make up 0 to 2 percent of the volume. Reaction ranges from medium acid to neutral.

Iuka Series

The Iuka series consists of very deep soils on flood plains along local streams. These soils are moderately well drained and moderately permeable. They formed in loamy alluvium. Slopes are 0 to 1 percent. The soils of the Iuka series are coarse-loamy, siliceous, acid, thermic Aquic Udifluvents.

Typical pedon of Iuka fine sandy loam, frequently flooded; from the intersection of U.S. Highways 59 and 80 in Marshall, 1.5 miles south on U.S. Highway 59, about 9.05 miles south on Texas Highway 43, about 0.5 mile west on Farm Road 2625, and 200 feet east of a road along a creek in an area of woodland:

A—0 to 4 inches; mottled dark grayish brown (10YR 4/2) and dark yellowish brown (10YR 4/4) fine sandy loam; weak medium subangular blocky structure; very friable; many fine, many medium, and few coarse roots; strongly acid; clear smooth boundary.

Bw1—4 to 14 inches; strong brown (7.5YR 5/6) fine sandy loam; weak coarse subangular blocky structure; very friable; common fine and medium and few coarse roots; few fine pores; very strongly acid; clear smooth boundary.

Bw2—14 to 20 inches; brownish yellow (10YR 6/6) fine sandy loam that has few thin strata of loam; few fine distinct grayish brown (10YR 5/2), few fine distinct strong brown (7.5YR 5/8), many coarse faint light yellowish brown (10YR 6/4), and few fine distinct very dark grayish brown (10YR 3/2) mottles; weak coarse subangular blocky structure; very friable; few fine roots; very strongly acid; abrupt smooth boundary.

Figure 13.—Profile of Bernaldo fine sandy loam, 1 to 3 percent slopes. The subsoil is brownish sandy clay loam and has subangular blocky structure.

Figure 14.—Profile of Bowie very fine sandy loam, 2 to 5 percent slopes. The subsoil is yellowish brown sandy clay loam.

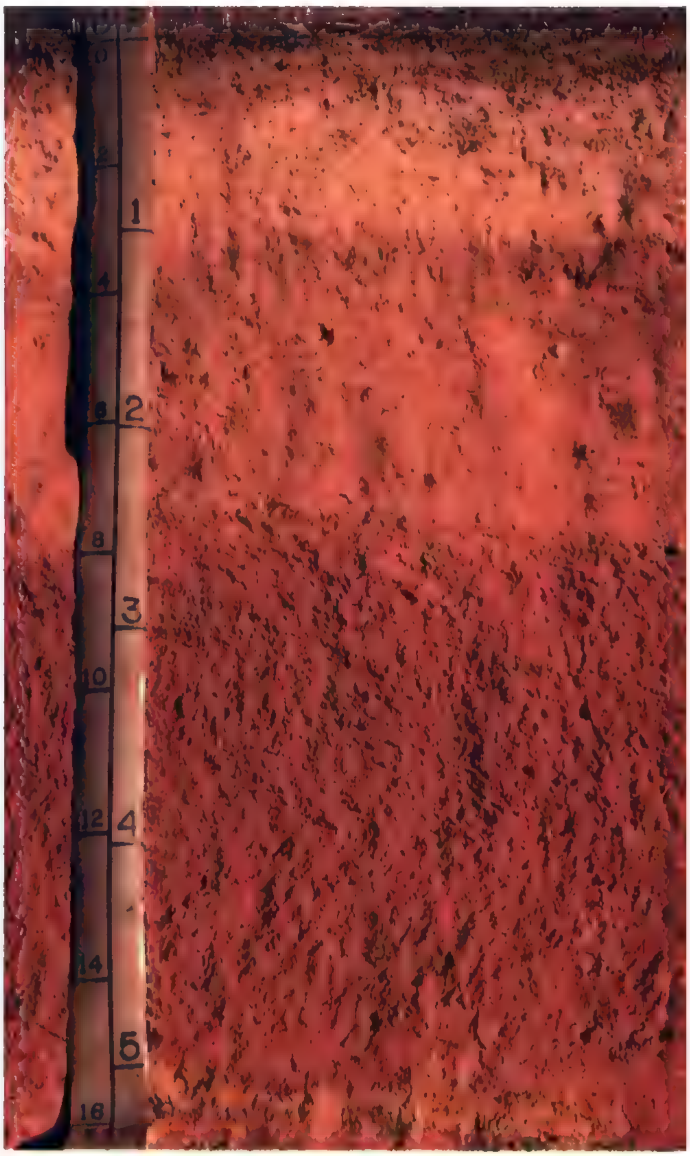

Figure 15.—Profile of Darbonne fine sandy loam, 3 to 5 percent slopes. The subsoil is dominantly reddish sandy clay loam.

Figure 16.—Profile of Elrose fine sandy loam, 1 to 3 percent slopes. The upper part of the subsoil is reddish loam and clay loam.

Figure 17.—Profile of Latch loamy fine sand. This soil has a thick, sandy surface layer and subsurface layer and a loamy subsoil.

Figure 18.—Profile of Latex fine sandy loam, 1 to 3 percent slopes. The upper part of the subsoil is loamy, and the lower part is dense, grayish and reddish, and clayey.

Figure 19.—Profile of Sacul very fine sandy loam, 1 to 5 percent slopes. Stratified clayey shale and sandstone are at a depth of about 4.5 feet.

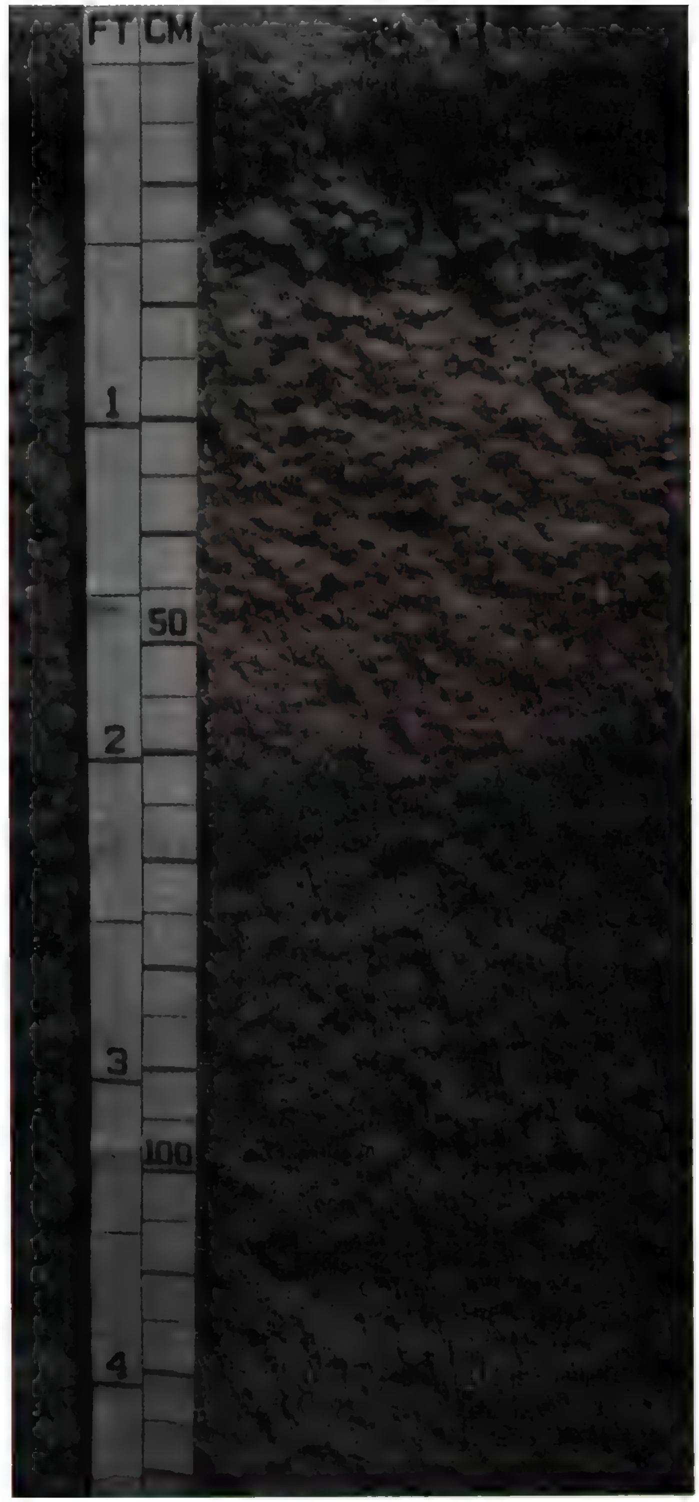

Figure 20.—Profile of Scottsville very fine sandy loam, 0 to 2 percent slopes. The upper part of the subsoil is loamy, and the lower part is dense, grayish and reddish, and clayey.

Bg1—20 to 37 inches; gray (10YR 6/1) silt loam that has few thin strata of very pale brown (10YR 7/4) loamy sand and few thick strata of light brownish gray (10YR 6/2) loam; many fine prominent yellowish red (5YR 5/6) and few fine prominent strong brown (7.5YR 5/8) mottles; weak coarse subangular blocky structure; friable; few fine roots; very strongly acid; clear smooth boundary.

Bg2—37 to 45 inches; mottled gray (10YR 5/1), light brownish gray (10YR 6/2), light yellowish brown (10YR 6/4), and strong brown (7.5YR 4/6) silt loam; few thin strata of very pale brown (10YR 7/4) loamy fine sand; weak coarse subangular blocky structure; very friable; very strongly acid; abrupt smooth boundary.

C1—45 to 70 inches; mottled pale brown (10YR 6/3), dark yellowish brown (10YR 4/4), light brownish gray (10YR 6/2), and dark brown (10YR 4/3) loamy fine sand; massive; very friable; strongly acid; gradual smooth boundary.

C2—70 to 80 inches; mottled light gray (10YR 7/2) and light brown (7.5YR 6/4) loamy fine sand; massive; very friable; strongly acid.

The solum ranges from 35 to 50 inches in thickness. The content of clay in the 10- to 40-inch control section is 10 to 18 percent. The content of gravel ranges from 0 to 10 percent, by volume. Some pedons have a buried A horizon below a depth of 20 inches. The water table is at a depth of 1 to 3 feet from December through April in most areas. Few or common mottles with chroma of 2 or less are in the upper 20 inches. The C horizon has many, common, or no bedding planes.

The A horizon is dark grayish brown, brown, pale brown, light yellowish brown, strong brown, or dark yellowish brown. Few or common fine mottles in shades of brown or gray may occur in this horizon. In some pedons the matrix is mottled with these colors. Reaction is very strongly acid or strongly acid in unlimed areas.

The Bw horizon is brown, yellowish brown, light yellowish brown, pale brown, strong brown, dark yellowish brown, yellowish red, or brownish yellow. Few to many, fine to coarse mottles in shades of gray, brown, or red may occur in this horizon. In some pedons the matrix is mottled with these colors. The texture is fine sandy loam, loam, loamy fine sand, or sandy clay loam. Reaction is very strongly acid or strongly acid.

The Bg horizon, if it occurs, is light brownish gray, gray, light gray, or grayish brown. Few to many, faint to prominent mottles in shades of gray, brown, yellow, or red may occur in this horizon. In some pedons the matrix is mottled with these colors. The texture is loam, silt loam, or fine sandy loam. Reaction is very strongly acid or strongly acid.

The C horizon is light brownish gray, grayish brown, dark gray, yellowish brown, or gray. Few to many, faint to prominent mottles in shades of yellow, brown, gray, or red may occur in this horizon. In some pedons the matrix is mottled with these colors. The texture is loamy fine sand, fine sandy loam, loam, or clay loam. Reaction is very strongly acid or strongly acid.

Kirvin Series

The Kirvin series consists of very deep soils on uplands. These soils have a thin, loamy surface layer and a thick, clayey subsoil. They are well drained and moderately slowly permeable. They formed in stratified, loamy and shaly deposits of the Reklaw and Weches Formations. Slopes range from 2 to 8 percent. The soils of the Kirvin series are clayey, mixed, thermic Typic Hapludults.

Typical pedon of Kirvin very fine sandy loam, 2 to 5 percent slopes; from the intersection of U.S. Highways 59 and 80 in Marshall, 8.4 miles north on U.S. Highway 59, about 3.9 miles west on Farm Road 1997 (0.3 mile south of the intersection of Farm Roads 3001 and 1997), and 0.7 mile west in a pasture:

A—0 to 6 inches; dark brown (7.5YR 3/2) very fine sandy loam; weak fine granular structure; slightly hard, very friable; many fine roots; about 2 to 3 percent, by volume, ironstone pebbles 2.5 centimeters in diameter; slightly acid; gradual smooth boundary.

E—6 to 14 inches; brown (7.5YR 5/4) very fine sandy loam; massive; slightly hard, very friable; common fine roots; slightly acid; abrupt smooth boundary.

Bt1—14 to 32 inches; dark red (2.5YR 3/6) clay; moderate fine subangular blocky structure; very hard; common fine roots; many thick continuous dark reddish brown (2.5YR 3/4) clay films on faces of peds; very strongly acid; gradual smooth boundary.

Bt2—32 to 41 inches; dark red (2.5YR 3/6) clay; few light brownish gray (10YR 6/2) shale fragments; moderate fine subangular blocky structure; very hard, very firm, slightly sticky and plastic; common fine roots; thick continuous dark reddish brown (2.5YR 3/4) clay films on faces of peds; very strongly acid; clear smooth boundary.

BC—41 to 50 inches; dark red (2.5YR 3/6) clay; common fine prominent strong brown (7.5YR 5/6) mottles; few pale brown (10YR 6/3) shale fragments; weak medium platy structure; very hard, very firm; slightly brittle; very strongly acid; clear smooth boundary.

C—50 to 61 inches; stratified dark red (2.5YR 3/6) and light brownish gray (10YR 6/2), weakly consolidated sandstone and shale having a texture of clay loam; common flakes of mica; very strongly acid.

The solum ranges from 40 to 60 inches in thickness.

The A horizon is dark brown, brown, dark grayish brown, or reddish brown. The texture is very fine sandy loam or gravelly fine sandy loam. Ironstone pebbles 2 millimeters to 2.5 centimeters across make up 1 to 35 percent of the volume. In a few pedons a few scattered stones more than 25 centimeters across are on the surface. Reaction ranges from strongly acid to slightly acid in unlimed areas.

The E horizon, if it occurs, is dark brown, light brown, brown, yellowish brown, or pale brown. The texture is very fine sandy loam or gravelly fine sandy loam. Ironstone pebbles 2 millimeters to 7.5 centimeters across make up 1 to 50 percent of the volume. Reaction ranges from strongly acid to slightly acid in unlimed areas.

Some pedons have a BE horizon. This horizon is strong brown, reddish yellow, brownish yellow, or yellowish brown. The texture and reaction are the same as those in the E horizon.

The Bt horizon is dark red, red, or yellowish red. It has no mottles or has few or common mottles in shades of yellow or brown. Thin, gray, platy shale fragments are in some pedons. The texture is clay, clay loam, or sandy clay. The content of clay ranges from 35 to 60 percent. Ironstone pebbles 2 millimeters to 7.5 centimeters across make up 0 to 10 percent of the volume. Reaction ranges from extremely acid to strongly acid.

The BC horizon has colors in shades of red, yellow, or brown and generally is mottled with these colors or in shades of gray. It has common, few, or no thin strata and fragments of sandstone or shaly material. The texture is sandy clay loam, clay loam, or clay. Reaction is extremely acid or very strongly acid.

The C horizon is stratified, weakly consolidated fine sandy loam, sandy clay loam, or clay loam and weakly cemented sandstone and shaly material. The loamy material and sandstone have colors in shades of red, yellow, or brown. The shaly material generally has colors in shades of gray. Some pedons have discontinuous, fractured, or indurated sandstone layers about 2.5 to 10 centimeters thick. Reaction is extremely acid or very strongly acid.

Latch Series

The Latch series consists of very deep soils on terraces. These soils are moderately well drained and moderately permeable. They formed in sandy and loamy sediments, mainly along the Sabine River and Little Cypress Bayou (fig. 17). Slopes are 0 to 1 percent. The soils of the Latch series are loamy, siliceous, thermic Grossarenic Paleudalfs.

Typical pedon of Latch loamy fine sand, in an area of Latch-Mollville complex, 0 to 1 percent slopes; from the intersection of U.S. Highways 59 and 80 in Marshall, 5.4 miles west on U.S. Highway 80, about 14.15 miles southwest on Farm Road 968, about 1.65 miles south and 3.0 miles east on a county road to a gate, 1.7 miles east on a private road, and 40 feet north in a pasture:

Ap—0 to 7 inches; dark brown (10YR 4/3) loamy fine sand; weak fine granular structure; very friable; many fine and medium roots; very strongly acid; clear smooth boundary.

E1—7 to 25 inches; yellowish brown (10YR 5/4) loamy fine sand; weak fine and medium granular structure; very friable; many fine and medium roots; very strongly acid; gradual smooth boundary.

E2—25 to 55 inches; yellowish brown (10YR 5/4) loamy fine sand; 1 to 3 percent, by volume, dark yellowish brown discontinuous lamellae in the lower part; weak fine granular structure; very friable; few fine roots; strongly acid; clear smooth boundary.

Bt—55 to 72 inches; yellowish brown (10YR 5/6) sandy clay loam; common fine distinct strong brown (7.5YR 5/6) and common fine distinct yellowish red (5YR 5/8) mottles; moderate coarse subangular blocky structure; many fine and medium pores; few fine patchy clay films on faces of peds; clay bridges between sand grains; very strongly acid; gradual smooth boundary.

BC—72 to 80 inches; brownish yellow (10YR 6/6) loamy fine sand; common medium distinct strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; friable; many fine and medium pores; very strongly acid; gradual smooth boundary.

C—80 to 90 inches; brownish yellow (10YR 6/6) fine sand; common medium faint yellowish brown (10YR 5/6) mottles; weakly stratified; friable; common fine and medium pores; strongly acid.

The solum ranges from 60 to 80 inches in thickness. The combined thickness of the A and E horizons ranges from 40 to 60 inches.

The A or Ap horizon is dark grayish brown, brown, dark brown, or yellowish brown. Reaction ranges from very strongly acid to slightly acid in unlimed areas.

The E horizon is brown, yellowish brown, very pale brown, or light yellowish brown. Reaction is very strongly acid to slightly acid in unlimed areas.

The Bt horizon is strong brown, yellowish brown, light brownish gray, or pale brown. It has few to many mottles with these colors and with shades of red. The

texture is fine sandy loam, loam, sandy clay loam, or clay loam. The content of clay ranges from 18 to 35 percent. Reaction ranges from very strongly acid to medium acid.

The BC or C horizon has colors in shades of gray or brown. It has few or common mottles in shades of yellow or red. The texture is loamy fine sand, fine sand, or fine sandy loam with or without streaks or lamellae of loamy material. Reaction is strongly acid or medium acid.

Latex Series

The Latex series consists of very deep soils on uplands. These soils are well drained and slowly permeable. They formed in loamy Pleistocene sediments and in the underlying clayey deposits of the Wilcox Group (fig. 18). Slopes range from 1 to 3 percent. The soils of the Latex series are fine-loamy, siliceous, thermic Glossic Paleudalfs.

Typical pedon of Latex fine sandy loam, 1 to 3 percent slopes; from the intersection of U.S. Highways 59 and 80 in Marshall, 0.45 mile south on U.S. Highway 59, about 15.1 miles southeast on Farm Road 31, about 1.2 miles east on Farm Road 451, about 1.3 miles north on a county road, 0.15 mile west on a private road, and 150 feet south in a hay meadow:

A—0 to 3 inches; dark brown (10YR 4/3) fine sandy loam; weak medium granular structure; very friable; many fine, common medium, and few coarse roots; very strongly acid; abrupt smooth boundary.

E—3 to 10 inches; brown (10YR 5/3) fine sandy loam; weak medium subangular blocky structure; very friable; common fine and few medium roots; strongly acid; clear smooth boundary.

Bt1—10 to 18 inches; strong brown (7.5YR 5/6) clay loam; few fine faint yellowish red (5YR 5/6) mottles; moderate coarse prismatic structure parting to moderate medium subangular blocky; firm; common fine and few medium roots; few thin patchy clay films on faces of peds; strongly acid; clear smooth boundary.

Bt2—18 to 33 inches; yellowish brown (10YR 5/6) clay loam; common fine distinct yellowish red (5YR 5/6) mottles; moderate coarse prismatic structure parting to moderate coarse subangular blocky; firm; few fine roots; few thin patchy clay films on faces of peds; about 3 percent, by volume, ironstone pebbles; very strongly acid; clear wavy boundary.

Bt/E—33 to 42 inches; yellowish brown (10YR 5/6) clay loam (Bt); common fine faint yellowish brown (10YR 5/8) and common medium distinct red (2.5YR 4/6) mottles; about 8 percent, by volume, streaks and pockets of light brownish gray (10YR 6/2) glossic material (E); moderate medium prismatic structure parting to moderate coarse subangular blocky; firm; few fine roots; few thin patchy clay films on faces of peds; few fine black concretions; about 4 percent, by volume, ironstone pebbles; very strongly acid; clear smooth boundary.

2Bt/E—42 to 46 inches; red (2.5YR 4/6) clay loam (Bt); few fine prominent light brownish gray (10YR 6/2) and few medium distinct brownish yellow (10YR 6/6) mottles; about 7 percent, by volume, streaks and pockets of light brownish gray (10YR 6/2) and pale brown (10YR 6/3) glossic material (E); moderate medium prismatic structure parting to moderate fine subangular blocky; very firm; few fine roots; common thin patchy clay films on faces of peds; very strongly acid; gradual smooth boundary.

2Btg—46 to 75 inches; mottled light brownish gray (10YR 6/2), red (2.5YR 4/8), and brownish yellow (10YR 6/6) clay; about 3 percent, by volume, streaks and pockets of light brownish gray (10YR 6/2) glossic material; moderate medium prismatic structure parting to moderate fine angular blocky; very firm; few fine roots; few thin patchy clay films on faces of peds; very strongly acid; clear smooth boundary.

2BCg—75 to 80 inches; mottled light gray (10YR 7/1), red (2.5YR 4/8), and yellowish red (5YR 5/8), weakly stratified very fine sandy loam and silt loam; weak thick platy structure parting to weak coarse subangular blocky; firm; very strongly acid.

The solum ranges from 60 to more than 80 inches in thickness. Depth to the 2B horizon ranges from 36 to 60 inches. Depth to a horizon with gray mottles is more than 30 inches. Base saturation 50 inches below the upper boundary of the Bt horizon ranges from 35 to 60 percent. Few or no petrified wood fragments are near the contact of the lithologic discontinuity. The control section ranges from 20 to 35 percent clay. The combined thickness of the A and E horizons ranges from 6 to 18 inches.

The A horizon is brown, dark brown, dark yellowish brown, or dark grayish brown. It has no mottles or has few or common fine mottles in shades of brown. Reaction ranges from very strongly acid to medium acid in unlimed areas.

The E horizon is brown, yellowish brown, light yellowish brown, or pale brown. It has no mottles or has few or common fine mottles in shades of brown. Reaction is very strongly acid or strongly acid in unlimed areas.

The EB horizon, if it occurs, is strong brown or yellowish brown. It has no mottles or has few or

common, fine or medium mottles in shades of brown or yellow. Some pedons have a mottled matrix with these colors. The texture is fine sandy loam or very fine sandy loam. Reaction is very strongly acid or strongly acid in unlimed areas.

The Bt horizon is strong brown, yellowish brown, yellowish red, reddish yellow, or brownish yellow. It has no mottles or has few to many, fine to coarse mottles in shades of red, brown, or yellow. The texture is loam, clay loam, or sandy clay loam. Lenses and interfingers of light brownish gray or pale brown very fine sand or fine sand make up 0 to 4 percent of the volume and increase in number with increasing depth. Ironstone pebbles make up 0 to 15 percent of the volume. Reaction is very strongly acid or strongly acid.

The Bt part of the Bt/E horizon is yellowish brown, brownish yellow, or reddish yellow. Few to many, fine or medium mottles in shades of red, brown, yellow, or gray may occur in this horizon. Some horizons have a mottled matrix with these colors. The texture is clay loam, loam, or sandy clay loam. The E part of the horizon occurs as lenses and interfingers of light brownish gray or pale brown silt, very fine sand, or fine sand. These lenses and interfingers make up 5 to 10 percent of the volume. Ironstone pebbles make up 0 to 15 percent of the volume. Brittle masses of red, dark red, or yellowish red material make up as much as 5 percent of the volume in some pedons. Reaction is very strongly acid or strongly acid.

The 2Bt part of the 2Bt/E horizon, if it occurs, is red, yellowish red, or brownish yellow. Few to many, fine or medium mottles in shades of gray, red, brown, or yellow may occur in this horizon. In some pedons the matrix has colors in shades of gray and is mottled. The texture is clay loam or clay. The E part of the horizon occurs as lenses and interfingers of light brownish gray or pale brown silt, very fine sand, or fine sand. These lenses and interfingers make up 5 to 15 percent of the volume. Ironstone pebbles make up 0 to 10 percent of the volume.

The 2Btg horizon is light brownish gray, gray, or light gray. Few to many, fine or medium mottles in shades of yellow, brown, or red may occur in this horizon. Some pedons have a mottled matrix with these colors. The texture is clay or silty clay. Lenses and interfingers of light brownish gray or pale brown silt, very fine sand, or fine sand make up 0 to 4 percent of the volume. This horizon has few or no slickensides, which are less than 4 inches across.

The 2BC horizon is light brownish gray, gray, or light gray. Common or many, fine or medium mottles in shades of red, yellow, or brown may occur in this horizon. Some pedons have a mottled matrix with these colors. This horizon is stratified clay loam, silty clay, clay, fine sandy loam, or siltstone. It has few or no pressure faces.

Lilbert Series

The Lilbert series consists of very deep soils on uplands. These soils are well drained and moderately slowly permeable. They formed in sandy and loamy deposits of Queen City Sand and Sparta Sand. Slopes range from 2 to 5 percent. The soils of the Lilbert series are loamy, siliceous, thermic Arenic Plinthic Paleudults.

Typical pedon of Lilbert loamy fine sand, 2 to 5 percent slopes; from the intersection of U.S. Highways 59 and 80 in Marshall, 2.7 miles west on U.S. Highway 80, about 0.7 mile north and 13.25 miles northwest on Texas Highway 154, about 2.85 miles northwest on Farm Road 450, about 3.55 miles west on a county road, 0.85 mile north on a private road, and 400 feet west in a new pine plantation:

A—0 to 9 inches; dark brown (10YR 4/3) loamy fine sand; weak medium granular structure; very friable; many fine and medium and few coarse roots; strongly acid; clear smooth boundary.

E1—9 to 14 inches; brown (10YR 5/3) loamy fine sand; weak fine subangular blocky structure parting to weak medium granular; very friable; common fine and medium and few coarse roots; common fine pores; strongly acid; clear smooth boundary.

E2—14 to 23 inches; light yellowish brown (10YR 6/4) loamy fine sand; weak medium subangular blocky structure parting to weak medium granular; very friable; common fine and medium roots; common fine pores; strongly acid; clear smooth boundary.

Bt1—23 to 34 inches; yellowish brown (10YR 5/6) sandy clay loam; few fine distinct yellowish red (5YR 4/6) mottles; weak medium prismatic structure parting to moderate medium subangular blocky; few fine and medium roots; common fine and medium pores; friable; about 4 percent, by volume, ironstone pebbles 2 to 10 millimeters in size; few thin discontinuous clay films on faces of peds; medium acid; gradual smooth boundary.

Bt2—34 to 43 inches; yellowish brown (10YR 5/6) sandy clay loam; common medium distinct yellowish red (5YR 5/6) mottles; moderate coarse prismatic structure parting to moderate medium subangular blocky; friable; common fine and medium roots; common fine and medium pores; few thin lenses of light yellowish brown (10YR 6/4) E material; few thin patchy clay films; about 2 percent, by volume, yellowish red (5YR 4/6) nodular plinthite; about 4 percent, by volume, ironstone pebbles 2 to 10 millimeters in size; medium acid; gradual smooth boundary.

Btv—43 to 60 inches; yellowish brown (10YR 5/6) sandy clay loam; common medium distinct strong brown (10YR 4/6) mottles; moderate coarse prismatic structure parting to moderate medium subangular blocky; slightly brittle in about 10 percent of the volume; friable; common fine and medium roots; common fine and medium pores; about 3 percent, by volume, thin lenses of pale brown (10YR 6/3) E material; few thin discontinuous clay films; about 6 to 7 percent, by volume, yellowish red (5YR 4/6) nodular plinthite; about 2 percent, by volume, ironstone pebbles 2 to 10 millimeters in size; very strongly acid; gradual smooth boundary.

Btv/E—60 to 77 inches; yellowish brown (10YR 5/8) sandy clay loam; common medium distinct yellowish red (5YR 4/6) mottles; weak coarse prismatic structure; slightly brittle or moderately brittle in about 20 percent of the volume; friable; common fine and medium roots; common fine and medium pores; about 6 to 8 percent, by volume, interfingers and lenses of light brownish gray (10YR 6/2) and pale brown (10YR 6/3) E material; common thin discontinuous clay films; about 5 to 6 percent, by volume, yellowish red (5YR 4/6) nodular plinthite; about 1 percent, by volume, ironstone pebbles 2 to 5 millimeters in size; very strongly acid; gradual smooth boundary.

Bt/E—77 to 84 inches; dark yellowish brown (10YR 4/6) sandy clay loam; common medium prominent red (2.5YR 4/8) and many medium faint light brownish gray (10YR 6/2) mottles; weak coarse subangular blocky structure; moderately brittle in about 25 percent of the volume; friable; few fine and medium roots; many fine and common coarse pores; common thin discontinuous clay films; about 2 percent, by volume, yellowish red (5YR 4/6) nodular plinthite; very strongly acid.

The solum ranges from 60 to more than 80 inches in thickness. The control section ranges from 20 to 32 percent clay. The combined thickness of the A and E horizons ranges from 20 to 40 inches. It generally is 20 to 23 inches and is 30 or more inches only in a few areas.

The A horizon is brown, dark grayish brown, grayish brown, very dark grayish brown, or yellowish brown. Reaction ranges from very strongly acid to slightly acid in unlimed areas.

The E horizon is yellowish brown, light yellowish brown, brown, pale brown, light brownish gray, brownish yellow, or strong brown. Reaction ranges from very strongly acid to slightly acid.

The Bt and Bt/E horizons, if they occur, are brownish yellow, yellowish brown, yellowish red, or strong brown. They have no mottles or have few to many, fine or medium mottles in shades of red or yellow. The texture is sandy clay loam or clay loam. The content of clay ranges from 20 to 37 percent. Pockets, lenses, interfingers, and coatings of E material along faces of peds make up 0 to less than 5 percent, by volume, of the Bt horizon and 5 to 10 percent of the Bt/E horizon. Slightly brittle masses make up 0 to 10 percent, by volume, of the matrix. The content of plinthite is less than 5 percent, by volume. Reaction ranges from very strongly acid to medium acid.

The Btv and Btv/E horizons, if they occur, are brownish yellow, pale brown, yellowish brown, or strong brown. Common or many, fine to coarse mottles in shades of red, brown, or yellow may occur in these horizons. Some pedons have mottles in shades of gray in the lower part. Some pedons have a mottled matrix with the same colors. The texture is sandy clay loam, clay loam, sandy clay, or fine sandy loam. The content of clay ranges from 17 to 38 percent. Pockets, lenses, interfingers, and coatings of E material along faces of peds make up 0 to less than 5 percent, by volume, of the Btv horizon and 5 to 10 percent of the Btv/E horizon. Slightly brittle masses make up 0 to 40 percent, by volume, of the matrix. The content of plinthite ranges from 5 to 10 percent, by volume. Reaction is very strongly acid or strongly acid.

The BC horizon, if it occurs, is red, reddish yellow, brownish yellow, or light gray. Common or many, fine to coarse mottles in shades of red, brown, yellow, or gray may occur in this horizon. Some pedons have a mottled matrix with the same colors. The texture is sandy clay loam, clay loam, sandy clay, or fine sandy loam. The content of clay ranges from 15 to 37 percent. Pockets, lenses, interfingers, and coatings of E material along faces of peds make up 0 to 5 percent of the volume. Reaction is very strongly acid or strongly acid.

Maben Series

The Maben series consists of soils that are moderately deep over weakly consolidated siltstone on uplands. These soils are well drained and moderately slowly permeable. They formed in material weathered from thinly bedded shale and siltstone of the upper Wilcox Group. Slopes range from 20 to 40 percent. The soils of the Maben series are fine, mixed, thermic Ultic Hapludalfs.

Typical pedon of Maben very fine sandy loam, 20 to 40 percent slopes; from the intersection of U.S. Highways 59 and 80 in Marshall, 0.2 mile north on U.S. Highway 59, about 13.65 miles northeast on Texas Highway 43, about 1.55 miles northeast on Farm Road

2198, about 0.1 mile north on a county road, 0.15 mile west on a private road, and 350 feet north along a bluff in an area of woodland:

A—0 to 4 inches; dark brown (10YR 4/3) very fine sandy loam; moderate medium granular structure; friable; many fine, medium, and coarse roots; common fine and medium pores; few fine and medium ironstone pebbles; medium acid; clear smooth boundary.

Bt1—4 to 18 inches; red (2.5YR 4/8) clay; few fine and medium prominent brownish yellow (10YR 6/6) mottles; moderate medium subangular blocky structure; firm; common fine, medium, and coarse roots; common fine and medium pores; common thin patchy clay films; very strongly acid; clear smooth boundary.

Bt2—18 to 24 inches; yellowish red (5YR 4/6) clay loam; common fine and medium distinct brownish yellow (10YR 6/6) mottles; moderate coarse subangular blocky structure; firm; few fine, medium, and coarse roots; common fine and medium pores; common thin patchy clay films; very strongly acid; clear smooth boundary.

BCt—24 to 32 inches; mottled yellowish red (5YR 4/6) and pale brown (10YR 6/3) silt loam; common medium distinct yellowish brown (5YR 5/6) and light brownish gray (10YR 6/2) mottles; weak coarse subangular blocky structure; friable; few fine and medium roots; common fine and medium pores; few fine patchy clay films; very strongly acid; gradual smooth boundary.

2C—32 to 60 inches; mottled yellowish red (5YR 5/6), pale brown (10YR 6/3), and light yellowish brown (2.5Y 6/4), weakly consolidated siltstone that has a texture of silt loam; massive; friable; few fine roots; common fine and medium pores; very strongly acid.

The solum ranges from 20 to 40 inches in thickness.

The A horizon is dark brown, brown, or yellowish brown. In some pedons erosion has exposed the subsoil. Reaction is strongly acid or medium acid.

The Bt horizon is dark red, red, reddish brown, or yellowish red. It has no mottles or has few or common mottles in shades of brown or yellow. The texture is clay, silty clay, silty clay loam, or clay loam. Some pedons have few to many soft, weathered, gray shale fragments. Reaction ranges from very strongly acid to medium acid.

The BC horizon has the same range in color as the Bt horizon, or it is mottled in shades of red, gray, or yellow. The texture is clay, clay loam, silty clay loam, loam, fine sandy loam, or sandy clay loam. Reaction ranges from very strongly acid to medium acid.

The 2C horizon is variegated in shades of red, gray, or yellow. It is thinly laminated and thinly bedded fine sand, loam, clay, clayey shale, and limonitic lenses. The soft, weathered shale is commonly rich in mica. Reaction ranges from very strongly acid to medium acid.

Mantachie Series

The Mantachie series consists of very deep soils on flood plains along local streams. These soils are somewhat poorly drained and moderately permeable. They formed in loamy alluvium. Slopes are 0 to 1 percent. The soils of the Mantachie series are fine-loamy, siliceous, acid, thermic Aeric Fluvaquents.

Typical pedon of Mantachie loam, in an area of Mooreville-Mantachie complex, frequently flooded; from the intersection of U.S. Highways 59 and 80 in Marshall, 2.7 miles west on U.S. Highway 80, about 0.1 mile north on Loop 390, about 15.2 miles northwest on Farm Road 449, and 1,100 feet south in a pasture:

Ag—0 to 8 inches; grayish brown (10YR 5/2) loam; few fine distinct strong brown (7.5YR 4/6) mottles; weak coarse subangular blocky structure; slightly hard, friable; common fine and few medium roots; few fine pores; very strongly acid; gradual smooth boundary.

Bg1—8 to 13 inches; commonly mottled grayish brown (10YR 5/2) and dark brown (7.5YR 4/4) loam; few fine faint light brownish gray (10YR 6/2), few fine distinct yellowish brown (10YR 5/8), and few fine faint dark gray (10YR 4/1) mottles; moderate fine subangular blocky structure; slightly hard, friable; common fine and few medium roots; few fine and medium pores; few fine black concretions; very strongly acid; gradual smooth boundary.

Bg2—13 to 23 inches; brownish gray (10YR 5/2) loam; common medium distinct dark yellowish brown (10YR 4/4) and common fine faint gray (10YR 5/1) mottles; moderate fine subangular blocky structure; slightly hard, friable; few fine roots; common fine and few medium pores; few fine black soft masses and black concretions; few thin skeletans; very strongly acid; gradual smooth boundary.

Bg3—23 to 36 inches; light brownish gray (10YR 6/2) loam; common medium faint dark gray (10YR 4/1), common fine faint dark brown (10YR 3/3), and few fine prominent yellowish red (5YR 5/6) mottles; moderate fine subangular blocky structure; slightly hard, friable; few fine roots; few fine and medium pores; few thin skeletans; few fine black soft masses and black concretions; very strongly acid; gradual smooth boundary.

Bg4—36 to 55 inches; gray (10YR 5/1) loam; few fine faint brown (10YR 5/3), few medium faint light brownish gray (10YR 6/2), and few fine prominent strong brown (7.5YR 5/8) mottles; moderate fine subangular blocky structure; slightly hard, friable; few fine roots; few fine and medium pores; few thin skeletans; few fine black soft masses and black concretions; very strongly acid; gradual smooth boundary.

Bg5—55 to 80 inches; gray (10YR 5/1) clay loam; few fine faint brown (10YR 5/3), few fine distinct yellowish brown (10YR 5/8), and few fine prominent strong brown (7.5YR 5/8) mottles; weak coarse subangular blocky structure; hard, firm; few fine roots; few fine pores; few fine black soft masses and black concretions; very strongly acid.

The solum ranges from 30 to more than 65 inches in thickness. Some pedons have about 5 percent, by volume, ironstone and siliceous pebbles.

The A horizon is dark brown, dark grayish brown, brown, dark yellowish brown, or yellowish brown, or it is mottled in shades of brown or gray. It is strongly acid or very strongly acid in unlimed areas.

The Bg horizon is strongly acid or very strongly acid. The upper part is dark grayish brown, grayish brown, brown, or yellowish brown. It has few to many grayish mottles, or it is mottled in shades of gray, brown, or yellow. The lower part is dark grayish brown, grayish brown, gray, light gray, or light brownish gray. It has few to many mottles in shades of brown or red. The texture is loam, silt loam, sandy clay loam, or clay loam. The content of clay in the 10- to 40-inch control section ranges from 18 to 34 percent.

Marklake Series

The Marklake series consists of very deep soils in reclaimed areas that formerly were mined for lignite. These soils are well drained and slowly permeable. They formed in spoil material. This material has been excavated to a depth of 30 to 150 feet, stockpiled, and randomly deposited in the mined pits. Slopes range from 1 to 20 percent. The soils of the Marklake series are fine-loamy, siliceous, acid, thermic Alfic Udarents.

Typical pedon of Marklake fine sandy loam, 1 to 3 percent slopes; from the intersection of U.S. Highways 59 and 80 in Marshall, 2.6 miles south on U.S. Highway 59, about 10.2 miles west and south on Texas Highway 43, about 0.5 mile west on Farm Road 2625, about 2.1 miles southwest on a county road, 315 feet east along a private road, and 50 feet south in an area of woodland:

Ap—0 to 6 inches; dark brown (10YR 4/3) fine sandy loam; common fine faint yellowish brown (10YR 5/6) and pale brown (10YR 6/3) mottles; weak medium subangular blocky structure; friable; many fine and common medium roots; common fine and medium pores; few fine black lignite fragments; few fine gray (10YR 6/1) shale fragments; strongly acid; clear smooth boundary.

C1—6 to 17 inches; yellowish brown (10YR 5/4) sandy clay loam; common medium faint brownish yellow (10YR 6/6) and light brownish gray (10YR 6/2) mottles; weak coarse subangular blocky structure; friable; few fine and medium roots; common fine and medium pores; few fine black lignite fragments; very strongly acid; gradual smooth boundary.

C2—17 to 24 inches; dark grayish brown (10YR 4/2) fine sandy loam; common medium distinct brownish yellow (10YR 6/6) and common medium faint dark brown (10YR 4/3) mottles; massive; friable; few fine and medium roots; few fine and medium pores; common medium black lignite fragments; strongly acid; gradual smooth boundary.

C3—24 to 40 inches; mottled yellowish brown (10YR 5/4), brown (10YR 5/3), and brownish yellow (10YR 6/6) fine sandy loam; few medium distinct reddish yellow (7.5YR 6/8) mottles; massive; friable; few fine roots; few fine pores; many medium black lignite fragments; very strongly acid; gradual smooth boundary.

C4—40 to 60 inches; light brownish gray (10YR 6/2) clay loam; common medium distinct strong brown (7.5YR 5/6) and few fine distinct yellow (10YR 7/6) mottles; massive; friable; few fine pores; common medium light gray (10YR 7/2) shale fragments; strongly acid.

The rooting depth ranges from 60 to more than 80 inches. The content of lignite and shale fragments 5 to 100 millimeters in diameter ranges from 0 to 20 percent, by volume, throughout the solum. These soils are made up dominantly of terrace remnants of Bernaldo, Erno, Cart, Guyton, and Bienville soils and the Wilcox Formation. The content of clay in the control section ranges from 18 to 30 percent.

The Ap horizon is brown, dark brown, yellowish brown, very dark grayish brown, brownish yellow, or dark grayish brown. It has no mottles or has few to many mottles in shades of brown, red, yellow, or gray. Some pedons have a mottled matrix with these colors. The texture varies considerably because of the mixing of soil material. The content of clay ranges from 4 to 30 percent. Reaction is very strongly acid or strongly acid in unlimed areas.

The C horizon is yellowish brown, dark grayish brown, light brownish gray, brown, light olive brown,

strong brown, light yellowish brown, light gray, brownish yellow, very dark grayish brown, gray, dark gray, yellowish red, or dark yellowish brown. It has no mottles or has few to many, fine to coarse mottles in shades of brown, gray, yellow, or red. Some pedons have a mottled matrix with these colors. The texture is clay loam, sandy clay loam, fine sandy loam, or loam. The content of clay ranges from 15 to 35 percent. Reaction is very strongly acid or strongly acid in unlimed areas.

Mathiston Series

The Mathiston series consists of very deep soils on flood plains along local streams. These soils are somewhat poorly drained and moderately permeable. They formed in loamy alluvium. Slopes are 0 to 1 percent. The soils of the Mathiston series are fine-silty, siliceous, acid, thermic Aeric Fluvaquents.

Typical pedon of Mathiston loam, in an area of Sardis-Mathiston complex, frequently flooded; from the intersection of U.S. Highways 59 and 80 in Marshall, 11.2 miles east on U.S. Highway 80, about 0.2 mile south on overpass of interstate, 1.4 miles east on a service road, 0.8 mile south on a private oil field road, 0.05 mile west on a private oil field road, and 1,425 feet north-northwest along a power transmission line in a pasture:

A—0 to 8 inches; grayish brown (10YR 5/2) loam; many fine and medium distinct yellowish brown (10YR 5/4) and few fine distinct gray (10YR 6/1) mottles; moderate medium subangular blocky structure; firm; many fine and few medium roots; few fine and medium pores; very strongly acid; clear smooth boundary.

Bw—8 to 14 inches; brown (10YR 5/3) silty clay loam; many medium faint grayish brown (10YR 5/2) mottles; strong medium subangular blocky structure; firm; common fine and few medium roots; common fine and few medium pores; very strongly acid; clear smooth boundary.

Bg1—14 to 24 inches; light brownish gray (2.5Y 6/2) silty clay loam; common fine faint grayish brown (2.5Y 5/2), common fine distinct very dark grayish brown (10YR 3/2), and few fine distinct dark yellowish brown (10YR 4/6) mottles; moderate fine subangular blocky structure; firm; common fine roots; many fine and common medium pores; about 4 percent, by volume, E material occurring as lenses on faces of peds; very strongly acid; clear smooth boundary.

Bg2—24 to 36 inches; light brownish gray (10YR 6/2 and 2.5Y 6/2) silty clay loam; few fine distinct brownish yellow (10YR 6/8) mottles; moderate medium subangular blocky structure; firm; few fine roots; common fine and few medium and coarse pores; about 2 percent, by volume, E material occurring as lenses on faces of peds; about 1 percent, by volume, black concretions 3 to 5 millimeters in diameter; very strongly acid; gradual smooth boundary.

Bg3—36 to 80 inches; grayish brown (10YR 5/2) clay loam; common fine prominent strong brown (7.5YR 5/8) mottles; moderate medium subangular blocky structure; very firm; few fine roots; few fine, medium, and coarse pores; common moderately thick patchy clay films on faces of peds; about 1 percent, by volume, E material occurring as lenses on faces of peds; about 1 percent, by volume, black concretions 1 to 7 millimeters in diameter; very strongly acid.

The solum ranges from 55 to more than 80 inches in thickness. The depth to a horizon that has a gray matrix ranges from 12 to 16 inches. The control section ranges from 18 to 34 percent clay. A perched water table is at a depth of 1 to 2 feet from December through April. The C horizon has many, common, or no bedding planes.

The A horizon is light brownish gray, grayish brown, dark grayish brown, brown, or dark yellowish brown. It has no mottles or has few to many, fine or medium mottles in shades of gray or brown. Reaction is very strongly acid or strongly acid in unlimed areas.

The Bw horizon is brown or yellowish brown. Few to many, fine or medium mottles in shades of brown or gray may occur in this horizon. Some pedons are mottled with these colors. The texture is silty clay loam, loam, or silt loam. Reaction is very strongly acid or strongly acid.

The Bg horizon is grayish brown, gray, light gray, or light brownish gray. Few to many, fine or medium mottles in shades of brown or yellow may occur in this horizon. The texture is silty clay loam, silt loam, loam, or clay loam. Reaction is very strongly acid or strongly acid.

The BC horizon, if it occurs, is light brownish gray or light gray. Common medium mottles in shades of yellow or brown may occur in this horizon. The texture is loam or clay loam. Reaction is very strongly acid or strongly acid.

The C horizon, if it occurs, is light gray, yellowish brown, or light yellowish brown. Few to many, fine or medium mottles in shades of brown, yellow, or gray may occur in this horizon. Some pedons are mottled with these colors. The texture is clay loam, loam, or fine sandy loam. Reaction is very strongly acid or strongly acid.

Metcalf Series

The Metcalf series consists of very deep soils on uplands. These soils are somewhat poorly drained and very slowly permeable. They formed in loamy Pleistocene deposits and in the underlying clayey deposits of the Wilcox Group. These soils are between mounds in close association with the mounded Cart soils. Slopes range from 0 to 2 percent. The soils of the Metcalf series are fine-silty, siliceous, thermic Aquic Glossudalfs.

Typical pedon of Metcalf silt loam, in an area of Metcalf-Cart complex, 0 to 2 percent slopes; from the intersection of U.S. Highways 59 and 80 in Marshall, 16.6 miles east on U.S. Highway 80, about 4.05 miles north on Farm Road 9, about 2.0 miles east on Masters Road, 0.35 mile south on a county road, 0.1 mile west on an oil field road, and 135 feet north in an area of woodland:

A—0 to 3 inches; grayish brown (10YR 5/2) silt loam; weak medium subangular blocky structure; very friable; common medium and fine roots; common medium and fine pores; very strongly acid; abrupt smooth boundary.

E—3 to 10 inches; light brownish gray (10YR 6/2) silt loam; few fine distinct strong brown (7.5YR 5/6) and common fine distinct brownish yellow (10YR 6/8) mottles; weak medium subangular blocky structure; very friable; few medium and fine roots; few medium and fine pores; very strongly acid; clear wavy boundary.

Bt/E1—10 to 21 inches; light yellowish brown (10YR 6/4) silt loam; few medium faint light brownish gray (10YR 6/2), few medium faint brownish yellow (10YR 6/6), and few fine prominent yellowish red (5YR 5/8) mottles; about 10 percent, by volume, light brownish gray (10YR 6/2) E material occurring as tongues, interfingers, and lenses; moderate medium prismatic structure; friable; few medium and fine roots; few medium and fine pores; very strongly acid; clear wavy boundary.

Bt/E2—21 to 29 inches; light yellowish brown (10YR 6/4) loam; few fine prominent yellowish red (5YR 5/8) and few fine distinct strong brown (7.5YR 5/8) mottles; about 20 percent, by volume, light brownish gray (10YR 6/2) E material occurring as tongues and interfingers; weak medium prismatic structure; friable; few medium and fine roots; few medium and common fine pores; few thin clay films on faces of peds; very strongly acid; clear wavy boundary.

2Btg1—29 to 36 inches; light brownish gray (10YR 6/2) clay loam; common medium distinct brownish yellow (10YR 6/6), common fine prominent red (2.5YR 5/6), and few medium prominent reddish yellow (5YR 6/6) mottles; about 2 percent, by volume, light brownish gray (10YR 6/2) E material occurring as tongues, interfingers, and lenses; moderate medium subangular blocky structure; very firm; few fine roots; few fine pores; few pressure faces; few thin clay films on faces of peds; very strongly acid; clear wavy boundary.

2Btg2—36 to 43 inches; light gray (10YR 7/2) clay; common medium distinct light yellowish brown (10YR 6/4), few fine distinct brownish yellow (10YR 6/8), and few fine prominent yellowish red (5YR 5/8) mottles; about 2 percent, by volume, E material occurring as lenses; moderate medium subangular blocky structure; very firm; few fine roots; few fine pores; few pressure faces; few thick clay films on faces of peds; very strongly acid; clear wavy boundary.

2Btg3—43 to 57 inches; light gray (10YR 7/2) clay; few fine faint very pale brown (10YR 7/4), few fine distinct brownish yellow (10YR 6/8), and few fine prominent reddish yellow (5YR 6/6) mottles; about 2 percent, by volume, E material occurring as lenses; moderate medium subangular blocky structure; very firm; few fine roots; few fine pores; few thick clay films on faces of peds; very strongly acid; clear wavy boundary.

2Btg4—57 to 73 inches; light gray (10YR 7/2) silty clay; few fine faint light yellowish brown (10YR 6/4) mottles; about 1 percent, by volume, E material occurring as lenses; weak medium subangular blocky structure; very firm; common medium and fine pores; few thick clay films on faces of peds; neutral; clear wavy boundary.

2BC—73 to 85 inches; light gray (10YR 7/2) silty clay loam; common fine faint pale brown (10YR 6/3) mottles; about 4 percent, by volume, E material occurring as lenses and interfingers; weak coarse subangular blocky structure; friable; few fine pores; neutral.

The thickness of the solum ranges from 60 to more than 80 inches. Depth to the clayey 2B horizon ranges from 27 to 40 inches. Base saturation 50 inches below the upper boundary of the Bt horizon ranges from 35 to 80 percent. The control section ranges from 18 to 30 percent clay. Grayish mottles are within the upper 10 inches of the argillic horizon.

The A horizon is grayish brown, very dark grayish brown, dark brown, brown, or dark grayish brown. Reaction is very strongly acid in unlimed areas.

The E horizon is grayish brown, brown, pale brown, light gray, or light brownish gray. Few or common, fine or medium mottles in shades of brown or yellow may

occur in this horizon. The texture is silt loam, loam, or very fine sandy loam. Reaction is very strongly acid in unlimed areas.

The Bt part of the Bt/E horizon is light yellowish brown, pale brown, or yellowish brown. Few to many, fine or medium mottles in shades of red, brown, yellow, or gray may occur in this horizon. In some pedons the matrix has colors in shades of gray and is mottled. Some pedons have a mottled matrix with these colors. The texture is silt loam, loam, or clay loam. The content of clay ranges from 17 to 34 percent and increases with increasing depth. Pockets, lenses, interfingers, and coatings of E material along faces of peds make up 5 to 20 percent of the volume. They are light brownish gray or light gray.

The 2Btg and 2Btg/E horizons, if they occur, are gray, light brownish gray, or light gray. Few to many, fine or medium mottles in shades of yellow, brown, or red may occur in these horizons. Some pedons have a mottled matrix with these colors. The texture is clay or clay loam. The content of clay ranges from 35 to 50 percent. Pockets, lenses, interfingers, coatings, and tongues of E material along faces of peds make up 0 to less than 5 percent, by volume, of the 2Btg horizon and 5 to 10 percent of the 2Btg/E horizon.

The 2BC horizon is light brownish gray or light gray. Few or common, fine to coarse mottles in shades of brown or yellow may occur in this horizon. The texture is clay, silty clay, silty clay loam, or silt loam. The content of clay ranges from 26 to 50 percent. Pockets, lenses, interfingers, and coatings of E material along faces of peds make up 0 to less than 5 percent of the volume. Reaction ranges from very strongly acid to neutral.

The 2C horizon, if it occurs, is brownish yellow or yellow. Few or common, fine or medium mottles in shades of gray may occur in this horizon. Some pedons have a mottled matrix with these colors. This horizon is stratified silt loam, silty clay loam, or siltstone.

Meth Series

The Meth series consists of very deep soils on uplands. These soils are well drained and moderately slowly permeable. They formed in loamy and clayey Tertiary deposits. Slopes range from 1 to 3 percent. The soils of the Meth series are fine, mixed, thermic Ultic Hapludalfs.

Typical pedon of Meth fine sandy loam, 1 to 3 percent slopes; from the intersection of U.S. Highways 59 and 80 in Marshall, 0.5 mile south on U.S. Highway 59, about 9.5 miles south on Texas Highway 31, about 1.4 miles east on Farm Road 2625 to a county road, and 100 feet northwest of an intersection in an area of woodland:

A—0 to 6 inches; dark brown (7.5YR 4/2) fine sandy loam; weak medium subangular blocky structure; very friable; common fine and medium roots; common fine and few medium pores; strongly acid; clear wavy boundary.

Bt1—6 to 19 inches; red (2.5YR 4/8) clay loam; few fine distinct yellowish red (5YR 5/6) mottles; moderate medium subangular blocky structure; very firm; few fine and medium roots; few fine and medium pores; few medium patchy clay films; very strongly acid; clear wavy boundary.

Bt2—19 to 25 inches; red (10R 4/8) clay; few fine prominent brownish yellow (10YR 6/6) and common fine and medium prominent reddish yellow (7.5YR 6/6) mottles; moderate medium subangular blocky structure; very firm; few fine roots; few fine pores; few medium patchy clay films; very strongly acid; clear wavy boundary.

Bt3—25 to 37 inches; red (10R 4/8) sandy clay loam; common fine prominent brownish yellow (10YR 6/8) mottles; moderate medium subangular blocky structure; very firm; few fine roots; few fine pores; weak medium patchy clay films; very strongly acid; clear wavy boundary.

BCt—37 to 59 inches; mottled light gray (10YR 7/2) and red (2.5YR 4/8) clay loam; common fine prominent brownish yellow (10YR 6/8) mottles; weak coarse subangular blocky structure; firm; few fine and medium roots; few fine pores; about 2 percent, by volume, skeletans on faces of peds; very strongly acid; clear smooth boundary.

C—59 to 64 inches; mottled strong brown (7.5YR 4/6), brownish yellow (10YR 6/6), yellowish red (5YR 5/8), and light brownish gray (10YR 6/2) loam; massive; few fine and medium roots; common fine pores; very strongly acid.

The solum ranges from 60 to more than 80 inches in thickness. Where the solum is more than 60 inches thick, the content of clay decreases by as much as 20 percent of the maximum within 60 inches of the surface. The control section ranges from 35 to 45 percent clay. The combined thickness of the A and E horizons ranges from 6 to 15 inches.

The A horizon is dark brown, brown, dark yellowish brown, or dark grayish brown. Reaction is strongly acid or medium acid in unlimed areas.

The E horizon, if it occurs, is strong brown, yellowish brown, or pale brown. It has no mottles or has few fine mottles in shades of brown. Reaction is strongly acid or medium acid in unlimed areas.

The Bt horizon is yellowish red, red, or dark red. It has no mottles or has few or common, fine or medium mottles in shades of brown, yellow, or red. The texture is clay, clay loam, sandy clay loam, or sandy clay. The content of clay ranges from 28 to 50 percent. Reaction is very strongly acid or strongly acid.

The BC horizon, if it occurs, is red, yellowish red, or strong brown. It has no mottles or has few fine mottles in shades of brown or gray. Some pedons have a mottled matrix with the same colors. The texture is clay loam or sandy clay loam. The content of clay ranges from 25 to 35 percent. Reaction is very strongly acid or strongly acid.

The C horizon, if it occurs, is strong brown or yellowish red. Some pedons have a mottled matrix of dark reddish brown, red, yellowish red, reddish yellow, brownish yellow, light brownish gray, or light gray. The texture is loam, clay loam, sandy clay loam, or fine sandy loam. The content of clay ranges from 15 to 37 percent. Reaction is very strongly acid or strongly acid.

Mollville Series

The Mollville series consists of very deep soils on stream terraces. These soils are poorly drained and slowly permeable. They formed in sandy and loamy alluvial sediments along the Sabine River and Little Cypress Bayou. Slopes are 0 to 1 percent. The soils of the Mollville series are fine-loamy, siliceous, thermic Typic Glossaqualfs.

Typical pedon of Mollville loam, in an area of Latch-Mollville complex, 0 to 1 percent slopes; from the intersection of U.S. Highways 59 and 80 in Marshall, 5.4 miles west on U.S. Highway 80, about 14.15 miles southwest on Farm Road 968, about 1.65 miles south and 3.0 miles southeast on a county road, 2.0 miles southeast and 0.25 mile north on a private road, and 500 feet northeast in a native pasture:

A—0 to 3 inches; dark grayish brown (10YR 4/2) loam; weak fine granular structure; friable; many fine and medium and few coarse roots; few fine pores; common fine distinct strong brown (7.5YR 4/6) organic stains; very strongly acid; clear smooth boundary.

E—3 to 8 inches; grayish brown (10YR 5/2) loam; common medium faint dark brown (10YR 4/3) and few fine distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure parting to weak fine granular; friable; common fine and medium roots; common fine and medium pores; common thin lenses of light gray (10YR 7/2) clean sand; very strongly acid; gradual wavy boundary.

Btg/E1—8 to 20 inches; grayish brown (10YR 5/2) loam (Btg); few fine distinct dark brown (7.5YR 3/4) and few medium distinct yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure; firm; few fine and medium roots; few fine pores; about 15 to 20 percent, by volume, light brownish gray (10YR 6/2) tongues and interfingers of E material; few thin patchy clay films on faces of peds parallel to the E material; very strongly acid; gradual smooth boundary.

Btg/E2—20 to 36 inches; light brownish gray (10YR 6/2) clay loam (Btg); common medium prominent strong brown (7.5YR 5/6) mottles; moderate medium prismatic structure; firm; few fine roots; few fine pores; about 5 percent, by volume, light gray (10YR 7/2) lenses and interfingers of E material; common thin patchy clay films on faces of peds; very strongly acid; clear smooth boundary.

Btg—36 to 48 inches; light brownish gray (10YR 6/2) loam; common fine distinct yellowish brown (10YR 5/6) mottles; weak coarse subangular blocky structure; friable; few fine roots; few fine pores; few thin clay films on faces of peds; many mica flakes; very strongly acid; gradual smooth boundary.

Cg—48 to 62 inches; light brownish gray (10YR 6/2) loamy fine sand; few fine and medium distinct yellowish brown (10YR 5/6) mottles; massive; friable; few fine roots; common medium pores; very strongly acid.

The solum ranges from 40 to more than 60 inches in thickness. The control section ranges from 20 to 35 percent clay.

The A horizon is dark grayish brown, grayish brown, or very dark grayish brown. It has no mottles or has few or common mottles in shades of brown or red. Reaction ranges from very strongly acid to medium acid.

The E horizon is grayish brown or light brownish gray. Few or common mottles in shades of brown may occur in this horizon. The texture is loam, silt loam, or fine sandy loam. Reaction ranges from very strongly acid to medium acid.

The Btg/E horizon is grayish brown, light brownish gray, or light gray. Few to many mottles in shades of brown, yellow, or gray may occur in this horizon. Some pedons have a mottled matrix with these colors in the lower part. The texture is clay loam, loam, silt loam, or sandy clay loam. The content of clay ranges from 18 to 34 percent. Tongues and interfingers of E material along faces of peds make up 15 to 25 percent, by volume, of the upper part of the horizon. Lenses and interfingers of E material along faces of peds make up 5 to 15 percent, by volume, of the lower part. They are light brownish gray or light gray. Reaction is very strongly acid to medium acid.

The BC horizon, if it occurs, has colors in shades of

gray or is mottled in shades of gray or brown. The texture is loam, fine sandy loam, or clay loam. Reaction is strongly acid to mildly alkaline.

The C horizon, if it occurs, has colors in shades of gray. It has no mottles or has few to many mottles in shades of brown. The texture is fine sandy loam, loam, or loamy fine sand. Reaction ranges from medium acid to mildly alkaline.

Mooreville Series

The Mooreville series consists of very deep soils on flood plains, mainly along the Sabine River and Little and Big Cypress Bayous. These soils are moderately well drained and moderately permeable. They formed in loamy alluvium. Slopes are 0 to 1 percent. The soils of the Mooreville series are fine-loamy, siliceous, thermic, Fluvaquentic Dystrochrepts.

Typical pedon of Mooreville loam, in an area of Mooreville-Mantachie complex, frequently flooded; from the intersection of U.S. Highways 59 and 80 in Marshall, 2.7 miles west on U.S. Highway 80, about 0.1 mile north on Loop 390, about 15.2 miles northwest on Farm Road 449, and 1,300 feet south in a pasture:

A1—0 to 6 inches; dark brown (10YR 4/3) loam; few fine faint light brownish gray (10YR 6/2) and few fine prominent yellowish red (5YR 5/8) mottles; moderate medium subangular blocky structure parting to moderate medium granular; friable; many fine and few medium roots; few fine, medium, and coarse pores; very strongly acid; clear smooth boundary.

A2—6 to 16 inches; dark brown (10YR 4/3) loam; few fine faint light brownish gray (10YR 6/2) and few fine faint dark yellowish brown (10YR 4/6) mottles; moderate medium subangular blocky structure; friable; common fine and few medium roots; common fine and medium and few coarse pores; very strongly acid; clear smooth boundary.

Bw—16 to 27 inches; yellowish brown (10YR 5/4) loam; few fine distinct dark yellowish brown (10YR 4/4), common fine faint brown (10YR 5/3), common fine distinct light brownish gray (10YR 6/2), and few fine distinct strong brown (7.5YR 5/6) mottles; moderate fine subangular blocky structure; friable; few fine roots; common fine and medium and few coarse pores; few thin skeletans; few fine black concretions; very strongly acid; clear smooth boundary.

Bg1—27 to 52 inches; gray (10YR 6/1) loam; common medium distinct yellowish brown (10YR 5/8), few fine prominent yellowish red (5YR 5/8), and few fine prominent strong brown (7.5YR 5/8) mottles; moderate medium subangular blocky structure; friable; few fine roots; few fine and medium pores; few thin skeletans; few fine black concretions and soft masses; very strongly acid; gradual smooth boundary.

Bg2—52 to 80 inches; gray (10YR 6/1) loam; few fine prominent red (2.5YR 4/8), few fine distinct yellowish brown (10YR 5/6), and few fine prominent yellowish red (5YR 4/8) mottles; weak medium subangular blocky structure; few fine roots; few fine pores; very strongly acid.

The solum ranges from 40 to more than 60 inches in thickness. The depth to a horizon with a gray matrix is more than 20 inches. The control section ranges from 18 to 30 percent clay.

The A horizon is dark brown, brown, dark grayish brown, or grayish brown. It has no mottles or has few or common mottles in shades of red or brown. The content of clay ranges from 15 to 27 percent. Reaction is very strongly acid or strongly acid.

The Bw horizon is dark yellowish brown, brown, or yellowish brown. It has no mottles or has few to many mottles in shades of brown, gray, red, or yellow. Some pedons are mottled with these colors. The texture is loam, clay loam, or sandy clay loam. The content of clay ranges from 18 to 35 percent. Reaction is very strongly acid or strongly acid.

The Bg horizon is grayish brown, light brownish gray, or gray. Few to many mottles in shades of brown, gray, or red may occur in this horizon. Some pedons are mottled with these colors. The texture is loam, clay loam, or sandy clay loam. The content of clay ranges from 18 to 35 percent. Reaction is very strongly acid or strongly acid.

The BC and C horizons, if they occur, have colors in shades of gray or are mottled in shades of red, gray, brown, or yellow. The texture is loam, sandy clay loam, or clay loam. Reaction is very strongly acid or strongly acid.

Nugent Series

The Nugent series consists of very deep soils on point bars and natural levees on flood plains along the Sabine River. These soils are excessively drained and rapidly permeable. They formed in sandy alluvium. Slopes range from 0 to 2 percent. The soils of the Nugent series are sandy, siliceous, thermic Typic Udifluvents.

Typical pedon of Nugent loam, frequently flooded; from the intersection of U.S. Highways 59 and 80 in Marshall, 1.5 miles south on U.S. Highway 59, about 12.5 miles southwest on Texas Highway 43, about 0.85 mile southeast and 0.9 mile west on a private road to a gate, 0.8 mile south along a high line, 0.25 mile

southwest to a bluff, 700 feet southwest along a riverbank, and 170 feet west in a native pasture:

A1—0 to 6 inches; dark yellowish brown (10YR 4/4) loam; common fine distinct brownish yellow (10YR 6/6) and common fine faint pale brown (10YR 6/3) mottles; weak fine granular structure; soft, very friable; common fine and medium roots; strongly acid; clear smooth boundary.

A2—6 to 13 inches; yellowish brown (10YR 5/4) loamy fine sand; common medium faint dark yellowish brown (10YR 4/4), common medium distinct pale brown (10YR 6/3), and few fine distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure parting to weak medium granular; soft, very friable; few fine and medium roots; few fine pores; very strongly acid; abrupt smooth boundary.

C1—13 to 20 inches; yellowish brown (10YR 5/4) fine sand; common fine distinct dark yellowish brown mottles; soft, very friable; common bedding planes that are 5 to 10 millimeters thick and have lenses of fine sandy loam; very strongly acid; abrupt smooth boundary.

C2—20 to 56 inches; yellowish brown (10YR 5/4) fine sand; few fine distinct yellow (10YR 7/6) mottles; soft, very friable; common bedding planes that are 5 to 20 millimeters thick and have lenses of fine sandy loam; strongly acid; clear smooth boundary.

C3—56 to 80 inches; brown (10YR 5/3) fine sand; common medium distinct yellow (10YR 7/6) mottles; soft, very friable; few bedding planes 5 to 10 millimeters thick; very strongly acid.

The solum is generally less than 20 inches thick.

The A horizon is dark yellowish brown, dark brown, yellowish brown, brown, pale brown, or light yellowish brown. Reaction ranges from very strongly acid to slightly acid.

The C horizon is light gray, light brownish gray, light yellowish brown, yellowish brown, brown, very pale brown, brownish yellow, or dark yellowish brown. Few to many brownish, yellowish, grayish, or reddish mottles may occur in this horizon. The texture is mainly loamy fine sand, but some pedons have few strata of fine sandy loam to clay loam. Reaction ranges from strongly acid to neutral.

Pickton Series

The Pickton series consists of very deep soils on uplands. These soils are well drained and moderately permeable. They formed in sandy and loamy deposits of Carrizo Sand or in lentil sands of the Wilcox Group. Slopes range from 2 to 15 percent. The soils of the Pickton series are loamy, siliceous, thermic Grossarenic Paleudalfs.

Typical pedon of Pickton loamy fine sand, 2 to 5 percent slopes; from the intersection of U.S. Highways 59 and 80 in Marshall, 0.2 mile north on U.S. Highway 59, about 13.7 miles northeast on Texas Highway 43, about 2.0 miles northwest on Texas Highway 134, about 0.75 mile south on a private road, and 500 feet west in an area of woodland:

A—0 to 7 inches; dark brown (10YR 4/3) loamy fine sand; weak fine granular structure; very friable; common fine and medium and few coarse roots; few medium pores; strongly acid; clear smooth boundary.

E1—7 to 28 inches; yellowish brown (10YR 5/4) loamy fine sand; single grain; loose; few fine and medium roots; medium acid; gradual smooth boundary.

E2—28 to 50 inches; brown (7.5YR 5/4) loamy fine sand; single grain; loose; few fine and medium roots; slightly acid; gradual smooth boundary.

E3—50 to 70 inches; yellowish brown (10YR 5/4) loamy fine sand; single grain; loose; few fine and medium roots; slightly acid; clear smooth boundary.

Bt1—70 to 83 inches; yellowish red (5YR 4/6) sandy clay loam; common medium prominent yellowish brown (10YR 5/6) and common medium prominent red (2.5YR 4/6) mottles; moderate medium subangular blocky structure; friable; few fine roots; few fine and medium pores; about 3 percent, by volume, pale brown (10YR 6/3) lenses and interfingers of E material; common thin patchy clay films on faces of peds; slightly acid; gradual smooth boundary.

Bt2—83 to 96 inches; yellowish red (5YR 4/6) sandy clay loam; common medium prominent strong brown (7.5YR 4/6), few fine faint red (2.5YR 4/6), and common medium prominent yellowish brown (10YR 5/4) mottles; moderate medium subangular blocky structure; friable; few fine roots; few fine and medium pores; about 3 percent, by volume, pale brown (10YR 6/3) lenses and interfingers of E material; common thin patchy clay films; strongly acid.

The solum is more than 80 inches thick. The combined thickness of the A and E horizons ranges from 40 to 72 inches. The content of clay in the control section ranges from 10 to 20 percent.

The A horizon is dark brown, dark grayish brown, or brown. Reaction is medium acid or slightly acid.

The E horizon is yellowish brown, light yellowish brown, pale brown, or brown. Reaction is medium acid or slightly acid.

The Bt/E or Bt horizon is red or yellowish red. It has

no mottles or has few or common mottles in shades of red, yellow, or brown. Lenses of E material make up 0 to 8 percent of the volume. The texture is fine sandy loam or sandy clay loam. The content of clay ranges from 10 to 24 percent. Reaction is strongly acid or medium acid.

Pirkey Series

The Pirkey series consists of very deep soils in reclaimed areas that formerly were mined for lignite. These soils are well drained and slowly permeable. They formed in reconstructed oxidized material. This material was stockpiled and then randomly redeposited on top of unoxidized material. Slopes range from 1 to 12 percent. The soils of the Pirkey series are fine-loamy, siliceous, acid, thermic Ultic Udarents.

Typical pedon of Pirkey very fine sandy loam, 3 to 5 percent slopes; from the intersection of U.S. Highways 59 and 80 in Marshall, 5.4 miles west on U.S. Highway 80, about 6.0 miles southwest on Farm Road 968, about 0.5 mile southeast along an entrance road to offices, 0.75 mile southeast on an access road, 0.1 mile east on a haul road, 0.5 mile south on A1 ramp, and 150 feet east in a pastured area of coastal bermudagrass:

Ap—0 to 6 inches; brown (10YR 4/3) very fine sandy loam; weak medium granular structure; friable; few fine and medium roots; few fine pores; about 4 percent, by volume, ironstone and sandstone pebbles 2 millimeters to 8 centimeters across; few fine spots of reddish and yellowish sandy clay loam; slightly acid; abrupt wavy boundary.

C1—6 to 16 inches; yellowish brown (10YR 5/6) sandy clay loam; common medium faint brownish yellow (10YR 6/6) and common medium distinct yellowish red (5YR 5/6) spots; moderate medium platy structure parting to weak medium subangular blocky; firm; few fine roots; few fine pores; few ironstone and sandstone pebbles 2 to 20 millimeters across; few fine strata of light brownish gray (10YR 6/2) shaly clay loam; very strongly acid; clear wavy boundary.

C2—16 to 35 inches; strong brown (7.5YR 5/6) sandy clay loam; few medium distinct brownish yellow (10YR 6/6) and common medium distinct yellowish red (5YR 5/6) spots; weak medium platy structure parting to weak medium subangular blocky; friable; few fine roots; few fine pores; few ironstone and sandstone pebbles 2 to 20 millimeters across; few thin strata of light brownish gray (10YR 6/2) and light gray (10YR 7/2) shaly clay loam; very strongly acid; abrupt wavy boundary.

C3—35 to 42 inches; brownish yellow (10YR 6/6) sandy clay loam; common medium distinct yellowish red (5YR 5/6) spots; weak medium platy structure parting to weak coarse subangular blocky; friable; few fine pores; few ironstone and sandstone pebbles 2 to 20 millimeters across; few medium strata of light gray (10YR 7/2) shaly clay loam; very strongly acid; clear wavy boundary.

C4—42 to 57 inches; mottled yellowish red (5YR 4/6) and yellowish brown (10YR 5/6) sandy clay loam; few fine faint yellowish brown (10YR 6/4) spots; weak medium platy structure parting to weak medium subangular blocky; friable; few fine pores; few ironstone and sandstone pebbles 2 to 20 millimeters across; few fine strata of light brownish gray (10YR 6/2) shaly clay loam; very strongly acid; clear wavy boundary.

2C—57 to 80 inches; very dark gray (10YR 3/1) clay loam; common coarse distinct dark yellowish brown (10YR 4/6) and yellowish brown (10YR 5/6) mottles; massive; firm; few fine masses of barite; common medium and coarse lignite fragments; ultra acid.

The rooting depth ranges from 40 to more than 60 inches. Unoxidized material and lignite fragments generally are not evident, but in some pedons they make up as much as 10 percent of the solum. The content of clay in the control section ranges from 20 to 35 percent. These soils are mainly reconstructed remnants of Bowie, Cuthbert, Kirvin, Sacul, and Sawyer soils of the Reklaw Formation.

The Ap horizon is dark grayish brown, dark brown, brown, dark yellowish brown, yellowish brown, or strong brown. Mottles in shades of brown, yellow, or red may occur in pedons that do not have a surface layer of very fine sandy loam. The content of clay ranges from 4 to 30 percent. Reaction is strongly acid or medium acid in unlimed areas.

The C horizon is yellowish brown, strong brown, brownish yellow, reddish yellow, light brown, or light yellowish brown. It has no mottles or has few to many mottles in shades of gray, brown, yellow, or red. A few pedons have a mottled matrix with these colors. The texture is fine sandy loam, clay loam, loam, or sandy clay loam. The content of clay ranges from 18 to 40 percent. Reaction is very strongly acid or strongly acid.

The 2C horizon is dark gray, dark grayish brown, brown, dark yellowish brown, strong brown, or dark brown. It has no mottles or has few to many mottles in shades of red, yellow, brown, or gray. Some pedons have a mottled matrix with these colors. The texture is fine sandy loam to clay. The content of clay ranges from 16 to 45 percent. Reaction ranges from ultra acid to strongly acid.

Sacul Series

The Sacul series consists of soils that are deep over siltstone on uplands. These soils are moderately well drained and slowly permeable. They formed in stratified, loamy and shaly sediments of the Reklaw Formation (fig. 19). Slopes range from 1 to 5 percent. The soils of the Sacul series are clayey, mixed, thermic Aquic Hapludults.

Typical pedon of Sacul very fine sandy loam, 1 to 5 percent slopes; from the intersection of U.S. Highways 59 and 80 in Marshall, 8.4 miles north on U.S. Highway 59, about 3.9 miles west on Farm Road 1997, about 1.2 miles northwest on Farm Road 3001, and 100 feet west in an area of woodland:

A—0 to 3 inches; very dark grayish brown (10YR 3/2) very fine sandy loam; weak fine granular structure; slightly hard, very friable; many fine and medium roots; medium acid; clear smooth boundary.

E—3 to 6 inches; dark grayish brown (10YR 4/2) very fine sandy loam; weak fine subangular blocky structure; slightly hard, very friable; common fine roots; medium acid; clear smooth boundary.

Bt1—6 to 16 inches; dark red (2.5YR 3/6) clay; moderate fine subangular blocky structure; very hard, firm; few fine roots; common clay films on faces of peds; very strongly acid; gradual wavy boundary.

Bt2—16 to 30 inches; red (2.5YR 4/6) clay; many medium prominent light brownish gray (10YR 6/2) and common medium distinct strong brown (7.5YR 5/6) mottles; moderate fine subangular blocky structure; very hard, firm; few fine roots; common clay films on faces of peds; very strongly acid; gradual wavy boundary.

Bt3—30 to 43 inches; grayish brown (10YR 5/2) clay; common fine prominent red (2.5YR 3/6) and common fine distinct strong brown (7.5YR 5/6) mottles; moderate fine subangular blocky structure; very hard, firm; few clay films on faces of peds; very strongly acid; clear irregular boundary.

BC—43 to 55 inches; mottled grayish brown (10YR 5/2), red (2.5YR 4/6), and strong brown (7.5YR 5/8) clay loam; weak fine subangular blocky and thin platy structure; very hard, firm; few clay films on faces of peds; very strongly acid; gradual wavy boundary.

C—55 to 70 inches; stratified light gray (10YR 7/2), strong brown (7.5YR 5/6), dark red (2.5YR 3/6), and dark grayish brown (10YR 4/2), weakly consolidated mudstone having a texture of silt loam and clay loam; moderate thin platy structure; hard, friable; very strongly acid.

The solum ranges from 40 to more than 72 inches in thickness. Where the solum is 40 to 60 inches thick, it is underlain by a C horizon of weakly consolidated material. Where the solum extends to a depth of more than 60 inches, the content of clay has decreased by 20 percent. Mottles with chroma of 2 or less are within a depth of 30 inches.

The A horizon is very dark grayish brown, dark grayish brown, or dark brown. Reaction is very strongly acid or strongly acid in unlimed areas.

The E horizon is brown, pale brown, yellowish brown, or light yellowish brown. Reaction is very strongly acid or strongly acid in unlimed areas.

The upper part of the Bt horizon is dark red, red, or yellowish red. It has no mottles or has few to many mottles in shades of brown or gray. The lower part has colors in shades of red or gray. It has mottles in shades of red, brown, yellow, or gray. Some pedons have a mottled matrix with these colors. This horizon is clay or silty clay. The content of clay ranges from 35 to 60 percent. Reaction is very strongly acid or strongly acid.

The BC horizon, if it occurs, is mottled in shades of brown, red, or gray. The texture is silt loam, clay loam, silty clay loam, or sandy clay loam. Reaction is very strongly acid or strongly acid.

The C horizon, if it occurs, is stratified red, yellow, and gray. It is weakly consolidated mudstone or sandstone having a texture of fine sandy loam, silt loam, or clay loam. Thin layers of sandstone and shale are in some pedons. Reaction is very strongly acid or strongly acid.

Sardis Series

The Sardis series consists of very deep soils on flood plains along local streams. These soils are somewhat poorly drained and moderately permeable. They formed in loamy alluvium. Slopes are 0 to 1 percent. The soils of the Sardis series are fine-silty, siliceous, thermic Fluvaquentic Dystrochrepts.

Typical pedon of Sardis loam, in an area of Sardis-Mathiston complex, frequently flooded; from the intersection of U.S. Highways 59 and 80 in Marshall, 11.2 miles east on U.S. Highway 80, about 0.2 mile south on overpass of interstate, 1.4 miles east on a service road, 0.8 mile south on a private oil field road, 0.05 mile west on a private oil field road, and 150 feet north-northwest along a power transmission line in a pasture:

A—0 to 5 inches; dark grayish brown (10YR 4/2) loam; common fine faint grayish brown (10YR 5/2) and few fine faint yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; very

friable; many fine and few medium roots; few medium and common fine pores; very strongly acid; abrupt wavy boundary.

Bw1—5 to 11 inches; brown (10YR 5/3) loam; common fine distinct yellowish brown (10YR 5/8), common fine faint gray (10YR 5/1), and few fine distinct strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; very friable; common fine and few medium roots; few fine and medium pores; few fine soft black masses; very strongly acid; clear smooth boundary.

Bw2—11 to 24 inches; brown (7.5YR 5/4) loam; few fine distinct light brownish gray (10YR 6/2) mottles; moderate medium subangular blocky structure; friable; few fine and medium roots; common medium and fine pores; few thin patchy clay films on faces of peds and in pores; very strongly acid; clear smooth boundary.

Bg1—24 to 33 inches; light brownish gray (10YR 6/2) silty clay loam; common fine faint brown (10YR 5/3) and few fine faint light yellowish brown (10YR 6/4) mottles; moderate fine subangular blocky structure; friable; few fine roots; many medium and common fine pores; few thin patchy clay films on faces of peds; about 8 percent E material occurring as lenses and interfingers; very strongly acid; clear smooth boundary.

Bg2—33 to 60 inches; gray (10YR 5/1) silty clay loam; few fine prominent reddish yellow (7.5YR 6/8), few fine distinct brownish yellow (10YR 6/6), and few fine distinct light olive brown (2.5Y 5/4) mottles; moderate medium subangular blocky structure; firm; few fine roots; few fine pores; few thin clay films on faces of peds; about 1 to 2 percent black concretions 1 to 3 millimeters in diameter; few white crystals; very strongly acid; gradual smooth boundary.

Bg3—60 to 94 inches; gray (10YR 6/1) silty clay loam; common medium distinct yellowish brown (10YR 5/8) and few fine faint dark yellowish brown (10YR 4/4) mottles; weak medium subangular blocky structure; firm; few fine roots; few fine pores; few thin clay films in pores; about 1 to 2 percent black concretions 1 to 3 millimeters in diameter; few soft black masses; medium acid.

The solum ranges from 55 to more than 80 inches in thickness. The depth to a horizon that has a gray matrix is more than 20 inches. The control section ranges from 18 to 30 percent clay. The C horizon has many, common, or no bedding planes.

The A horizon is dark grayish brown, brown, dark yellowish brown, or yellowish brown. It has no mottles or has few or common fine mottles in shades of gray, brown, or yellow. Reaction ranges from very strongly acid to medium acid in unlimed areas.

The Bw horizon is brown, yellowish brown, or pale brown. It has no mottles or has few or common, fine or medium mottles in shades of brown, gray, or yellow. Some pedons are mottled with these colors. The texture is loam or silt loam. Reaction ranges from very strongly acid to medium acid.

The Bg horizon, if it occurs, is grayish brown, light brownish gray, gray, or light gray. Few to many, fine or medium mottles in shades of brown or yellow may occur in this horizon. The texture is clay loam, loam, or silty clay loam. Reaction ranges from very strongly acid to medium acid.

The BC horizon, if it occurs, is light brownish gray, light gray, brownish yellow, or light yellowish brown. Few to many, fine or medium mottles in shades of brown or gray may occur in this horizon. Some pedons are mottled with these colors. The texture is loam, silty clay loam, or fine sandy loam. Reaction ranges from very strongly acid to medium acid.

The C horizon, if it occurs, is light brownish gray or brown. Few fine or medium mottles in shades of brown or yellow may occur in this horizon. Some pedons are mottled with these colors. The texture is silt loam to clay loam. Reaction ranges from very strongly acid to medium acid.

Sawyer Series

The Sawyer series consists of very deep soils on uplands. These soils are moderately well drained and slowly permeable. They formed in loamy Pleistocene sediments and in the underlying clayey deposits of the Reklaw Formation. Slopes range from 0 to 2 percent. The soils of the Sawyer series are fine-silty, siliceous, thermic Aquic Paleudults.

Typical pedon of Sawyer very fine sandy loam, 0 to 2 percent slopes; from the intersection of U.S. Highways 59 and 80 in Marshall, 2.7 miles west on U.S. Highway 80, about 0.7 mile north on Loop 390, about 5.1 miles northwest on Texas Highway 154, about 1.0 mile north on a county road, 0.5 mile northeast on a county road, 1.0 mile north and 0.1 mile east on a county road, and 300 feet southwest from a gate in an area of hayland:

Ap—0 to 8 inches; dark grayish brown (10YR 4/2) very fine sandy loam; few fine faint dark yellowish brown (10YR 4/4) mottles; weak medium subangular blocky structure parting to moderate medium granular; friable; common fine and medium roots; common fine pores; few medium wormcasts; strongly acid; abrupt smooth boundary.

E—8 to 13 inches; brown (10YR 5/3) very fine sandy loam; common fine faint yellowish brown (10YR 5/4)

mottles; weak medium subangular blocky structure; friable; common fine and medium roots; many fine and medium pores; few medium wormcasts; strongly acid; clear wavy boundary.

Bt/E1—13 to 21 inches; yellowish brown (10YR 5/4) loam; common fine faint yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; friable; few fine and medium roots; common fine and medium pores; about 7 percent, by volume, lenses and interfingers of brown (10YR 5/3) E material; few thin patchy clay films on faces of peds and in pores; very strongly acid; clear smooth boundary.

Bt/E2—21 to 26 inches; yellowish brown (10YR 5/4) clay loam; common fine prominent yellowish red (5YR 4/6), few fine distinct light brownish gray (10YR 6/2), and common fine faint yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; friable; few fine and medium roots; few fine and medium pores; about 5 percent, by volume, pale brown (10YR 6/3) lenses of E material; few thin patchy clay films on faces of peds and in pores; very strongly acid; clear smooth boundary.

2Btg1—26 to 31 inches; mottled light brownish gray (10YR 6/2) and yellowish brown (10YR 5/6) clay loam; many medium prominent yellowish red (5YR 4/6) mottles; moderate fine subangular blocky structure; friable; few fine and medium roots; few fine and medium pores; few thin lenses of light brownish gray E material; common thin patchy clay films on faces of peds; very strongly acid; clear smooth boundary.

2Btg2—31 to 64 inches; gray (10YR 5/1) clay; common medium prominent dark red (2.5YR 3/6) and yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; firm; few fine roots; few fine pores; few thin lenses of light brownish gray (10YR 6/2) E material; common thin continuous clay films on faces of peds; very strongly acid; clear smooth boundary.

2BCg—64 to 80 inches; light brownish gray (10YR 6/2) clay loam; common medium prominent dark red (2.5YR 3/6) and reddish brown (5YR 5/4) mottles; weak medium subangular blocky structure; firm; few fine roots; few fine pores; few thin patchy clay films on faces of peds; very strongly acid.

The thickness of the solum ranges from 60 to more than 80 inches. Depth to the clayey 2B horizon ranges from 20 to 40 inches. Base saturation about 50 inches below the upper boundary of the Bt horizon is less than 35 percent. Mottles with chroma of 2 or less are within a depth of 30 inches.

The A horizon is brown, grayish brown, or dark grayish brown. Reaction is very strongly acid or strongly acid in unlimed areas.

The E horizon is yellowish brown, pale brown, brown, or grayish brown. The texture is very fine sandy loam, silt loam, or loam. Reaction is very strongly acid or strongly acid in unlimed areas.

The Bt or Bt/E horizon, if it occurs, is yellowish brown or strong brown. Most pedons have few or common mottles in shades of red, gray, brown, or yellow. The texture is loam or clay loam. The content of clay ranges from 22 to 35 percent. Lenses of E material make up 0 to 10 percent of the volume. Reaction is very strongly acid or strongly acid.

The 2Bt horizon, if it occurs, has colors in shades of brown and mottles in shades of red or gray, or it is mottled in shades of red, yellow, gray, or brown. The texture is clay or silty clay. The content of clay ranges from 40 to 60 percent.

The 2Btg horizon is dominated by colors in shades of gray. It has few to many mottles in shades of red, brown, or yellow. The texture and reaction are similar to those of the 2Bt horizon.

The 2BCg horizon, if it occurs, has colors in shades of gray. It has mottles in shades of red. The texture is silty clay, clay loam, or silty clay loam.

The 2Cg horizon, if it occurs, has colors in shades of gray. It has mottles in shades of red. The texture is silt loam to silty clay loam.

Scottsville Series

The Scottsville series consists of very deep soils on uplands. These soils are moderately well drained and very slowly permeable. They formed in loamy Pleistocene sediments and in the underlying clayey deposits of the Wilcox Group (fig. 20). Slopes range from 0 to 2 percent. The soils of the Scottsville series are fine-loamy over clayey, siliceous, thermic Glossaquic Paleudalfs.

Typical pedon of Scottsville very fine sandy loam, 0 to 2 percent slopes; from the intersection of U.S. Highways 59 and 80 in Marshall, 0.5 mile south on U.S. Highway 59, about 15.8 miles southeast on Farm Road 31, about 1.75 miles east on Farm Road 451, about 1.15 miles north on a county road, and 300 feet west in a pasture:

Ap—0 to 4 inches; dark brown (10YR 4/3) very fine sandy loam; weak fine granular structure; very friable; slightly hard; many fine and few medium roots; common fine pores; strongly acid; clear smooth boundary.

E—4 to 12 inches; yellowish brown (10YR 5/4) very fine

sandy loam; common fine faint grayish brown (10YR 5/2) and common medium distinct yellowish brown (10YR 5/8) mottles; weak medium prismatic structure parting to moderate medium subangular blocky; very friable; slightly hard; common fine and few medium roots; few fine pores; strongly acid; clear smooth boundary.

Bt—12 to 19 inches; yellowish brown (10YR 5/6) loam; common fine prominent yellowish red (5YR 5/8) and few fine faint brown (10YR 5/3) mottles; about 3 percent, by volume, streaks and coatings of yellowish brown (10YR 5/4) clean sand and silt; weak medium prismatic structure parting to moderate medium subangular blocky; very friable, hard; common fine and few medium roots; common fine pores; few fine black concretions; few thin patchy clay films in pores and on faces of peds; strongly acid; gradual smooth boundary.

Bt/E1—19 to 30 inches; yellowish brown (10YR 5/6) loam (Bt); few fine and medium prominent red (2.5YR 4/8), many fine prominent yellowish red (5YR 5/8), and common fine faint grayish brown (10YR 5/2) mottles; about 8 to 10 percent, by volume, coatings and interfingers and 2 to 3 percent tongues of pale brown (10YR 6/3) clean sand and silt; weak medium prismatic structure parting to moderate fine subangular blocky; friable, hard; common fine and few medium roots; common fine and medium pores; few fine and medium black concretions; few thin patchy clay films in pores and on faces of peds; very strongly acid; clear wavy boundary.

Bt/E2—30 to 33 inches; yellowish brown (10YR 5/6) clay loam; many fine and medium prominent red (2.5YR 4/8) and many fine distinct light brownish gray (10YR 6/2) mottles; about 9 percent, by volume, coatings and interfingers and few tongues of light brownish gray (10YR 6/2) clean sand and silt; weak medium prismatic structure parting to moderate medium subangular blocky; friable, very hard; few fine roots; common fine pores; few fine black concretions; few thin patchy clay films in pores and on faces of peds; few fine ironstone pebbles; few fragments of petrified wood less than 3 inches across in the lower part; very strongly acid; clear wavy boundary.

2Btg—33 to 60 inches; light brownish gray (10YR 6/2) clay; many fine and medium prominent dark red (2.5YR 3/6) and few fine prominent strong brown (7.5YR 5/6) mottles; moderate coarse prismatic structure parting to moderate medium angular blocky; firm, very hard; few fine roots; few fine pores; few fine skeletans in the upper 2 inches; few small slickensides; few thin patchy clay films on faces of peds; very strongly acid; clear smooth boundary.

2BCtg—60 to 80 inches; light gray (5Y 7/2) clay; many medium prominent yellowish brown (10YR 5/8) and common medium and coarse prominent yellowish red (5YR 5/8) mottles; weak coarse prismatic structure; very firm; few fine roots; few pressure faces; few thin patchy clay films on faces of peds; very strongly acid.

The thickness of the solum ranges from 60 to more than 80 inches. Depth to the clayey 2B horizon ranges from 20 to 40 inches. In some pedons a few petrified wood fragments are near the contact of the 2B horizon. The content of clay in the fine-loamy part of the control section ranges from 18 to 26 percent. The content of clay increases 25 to 40 percent between the contrasting loamy and clayey horizons. The transition layer between these horizons is less than 5 inches thick. The combined thickness of the A, E, and EB horizons ranges from 6 to 19 inches.

The A horizon is grayish brown, brown, dark brown, dark grayish brown, or very dark grayish brown. Reaction ranges from very strongly acid to medium acid in unlimed areas.

The E horizon is pale brown, light yellowish brown, brown, or yellowish brown. It has no mottles or has few or common mottles in shades of brown or yellow. The texture is fine sandy loam, silt loam, loam, or very fine sandy loam. Reaction ranges from very strongly acid to medium acid in unlimed areas.

The EB horizon, if it occurs, is yellowish brown, brownish yellow, strong brown, or reddish yellow. It has no mottles or has few mottles in shades of brown or yellow. The texture is fine sandy loam, very fine sandy loam, silt loam, or loam. Reaction ranges from very strongly acid to medium acid in unlimed areas.

The Bt horizon is light brown, reddish yellow, strong brown, brown, light yellowish brown, brownish yellow, or yellowish brown. It has no mottles or has few or common mottles in shades of red, yellow, or brown. Mottles with chroma of 2 or less are at a depth of 18 to 29 inches. The texture is loam, clay loam, or sandy clay loam. Coatings and interfingers of light gray to pale brown clean sand and silt make up 0 to 4 percent of the volume. Reaction is very strongly acid or strongly acid in unlimed areas.

The Bt part of the Bt/E horizon is light brown, reddish yellow, strong brown, brown, light yellowish brown, brownish yellow, or yellowish brown. It has no mottles or has few to many mottles in shades of red, yellow, or gray. The texture is loam, clay loam, or sandy clay loam. Coatings and interfingers of light gray to pale brown clean sand and silt (E part) make up 5 to 15

percent of the volume. Dark concretions make up 0 to 5 percent of the volume. Reaction is very strongly acid or strongly acid.

The 2Btg horizon is gray, light brownish gray, or grayish brown. It has few to many mottles in shades of red, yellow, or brown. Some pedons have a mottled matrix with these colors. In addition to the 2Btg horizon, some pedons have a 2Bt horizon, which has a matrix color in shades of red, yellow, or brown and has common or many grayish mottles. The content of clay ranges from 40 to 60 percent. Some pedons have a thin transitional layer that is less clayey. There are few or common small slickensides and pressure faces. Coatings and interfingers of clean sand and silt make up 0 to less than 5 percent of the volume.

The 2BCg and 2Cg horizons, if they occur, are light gray, gray, olive gray, light olive gray, light brownish gray, grayish brown, or pinkish gray. They have few to many mottles in shades of red, yellow, or brown. Some pedons have a mottled matrix with these colors. Some pedons have a 2BC or 2C horizon, which has a matrix color in shades of yellow or brown and has no mottles or few or common mottles in shades of gray, red, or brown. The texture is clay, clay loam, sandy clay loam, or fine sandy loam. Reaction ranges from very strongly acid to medium acid.

Socagee Series

The Socagee series consists of very deep soils on flood plains along local streams. These soils are poorly drained and moderately permeable. They formed in loamy alluvium. Slopes are 0 to 1 percent. The soils of the Socagee series are fine-silty, siliceous, acid, thermic Typic Fluvaquents.

Typical pedon of Socagee silty clay loam, frequently flooded; from the intersection of U.S. Highways 59 and 80 in Marshall, 16.6 miles east on U.S. Highway 80, about 2.65 miles north on Texas Highway 9, about 1.1 miles east on a private oil field road, and 150 feet south in an area of woodland:

Ag—0 to 7 inches; gray (10YR 6/1) silty clay loam; many fine distinct dark yellowish brown (10YR 4/4) and common fine distinct dark yellowish brown (10YR 4/6) mottles; moderate medium subangular blocky structure; friable; many fine and common medium roots; few fine and medium pores; about 2 percent, by volume, silt and clean sand coatings on faces of peds; about 4 percent, by volume, soft black masses 1 to 3 millimeters in diameter; very strongly acid; clear smooth boundary.

Bg1—7 to 21 inches; gray (10YR 6/1) silty clay loam; common fine distinct dark yellowish brown (10YR 4/6) and common fine distinct yellowish brown (10YR 5/4) mottles; moderate medium subangular blocky structure; friable; common fine and medium roots; common fine and medium pores; about 2 percent, by volume, silt and clean sand coatings on faces of peds; few soft black masses 1 to 2 millimeters in diameter; very strongly acid; clear smooth boundary.

Bg2—21 to 40 inches; light gray (10YR 7/1) clay loam; few fine and medium distinct brownish yellow (10YR 6/8) mottles; moderate medium subangular blocky structure; friable; common fine and medium roots; few fine, medium, and coarse pores; few thin patchy clay films on faces of peds; about 4 percent, by volume, silt and clean sand coatings on faces of peds; few soft black masses 1 to 7 millimeters in diameter; very strongly acid; clear smooth boundary.

Bg3—40 to 60 inches; grayish brown (10YR 5/2) clay loam; few fine distinct brownish yellow (10YR 6/8) and few fine distinct strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; firm; few fine and medium roots; few fine and medium pores; few thin patchy clay films on faces of peds; about 2 percent, by volume, silt and clean sand coatings on faces of peds; few black concretions 1 to 3 millimeters in diameter; few barite crystals; very strongly acid; gradual smooth boundary.

Bg4—60 to 70 inches; light brownish gray (10YR 6/2) clay loam; few medium distinct brownish yellow (10YR 6/8) and few fine distinct yellowish brown (10YR 5/8) mottles; weak medium subangular blocky structure; firm; few fine roots; few fine pores; few thin patchy clay films on faces of peds; about 4 percent, by volume, silt and clean sand coatings on faces of peds; few soft black masses 1 to 3 millimeters in diameter; few fine whitish barite crystals; very strongly acid; clear smooth boundary.

BCg—70 to 80 inches; light brownish gray (10YR 6/2) loam; common medium distinct brownish yellow (10YR 6/8) and few medium prominent strong brown (7.5YR 5/6) mottles; massive; friable; few fine roots; few soft black masses 1 to 3 millimeters in diameter; very strongly acid.

The solum ranges from 60 to more than 80 inches in thickness. The content of clay in the 10- to 40-inch control section ranges from 20 to 35 percent. A perched water table is within a depth of 1.5 feet from December through May. Clean sand and silt coatings make up 0 to 4 percent of the volume throughout the profile. Few or no soft masses and concretions of barite or calcium carbonate are below a depth of 40 inches. The content of organic carbon decreases irregularly with increasing

depth or is more than 0.2 percent at a depth of about 50 inches.

The A horizon is gray, light brownish gray, grayish brown, or dark grayish brown. It has no mottles or has few to many mottles in shades of brown. Reaction is very strongly acid in unlimed areas.

Some pedons have an A2 horizon. This horizon is dark grayish brown, grayish brown, or light brownish gray. It has few or common mottles in shades of brown. The texture is loam to silty clay loam.

The Bg horizon generally is light gray, gray, or light brownish gray, but in some pedons it is grayish brown or dark gray below a depth of 40 inches. It has few to many mottles in shades of brown, yellow, gray, or red. The texture is silty clay loam to silt loam. The content of clay ranges from 20 to 40 percent. Some pedons have clay below the control section. Reaction ranges from extremely acid to strongly acid in the control section and from very strongly acid to neutral below a depth of 40 inches.

The BCg horizon is light brownish gray, grayish brown, or pale brown. It has few to many mottles in shades of brown, red, yellow, or gray. The texture is loam to clay loam. Reaction ranges from very strongly acid to neutral.

Warnock Series

The Warnock series consists of very deep soils on uplands. These soils are moderately well drained and moderately permeable. They formed in sandy and loamy deposits of Queen City Sand and Sparta Sand. Slopes range from 8 to 15 percent. The soils of the Warnock series are fine-loamy, siliceous, thermic Typic Paleudults.

Typical pedon of Warnock loamy fine sand, 8 to 15 percent slopes; from the intersection of U.S. Highways 59 and 80 in Marshall, 2.7 miles west on U.S. Highway 80, about 0.7 mile north and 13.8 miles northwest on Texas Highway 154, about 0.9 mile north on a county road, and 100 feet west in an area of woodland:

A—0 to 3 inches; dark yellowish brown (10YR 4/4) loamy fine sand; weak medium granular structure; very friable; common fine, medium, and coarse roots; few fine pores; strongly acid; clear smooth boundary.

E—3 to 19 inches; yellowish brown (10YR 5/4) loamy fine sand; weak medium subangular blocky structure; very friable; few fine and medium roots; few fine pores; strongly acid; clear smooth boundary.

Bt1—19 to 31 inches; yellowish brown (10YR 5/8) fine sandy loam; common medium distinct strong brown (7.5YR 5/6) and common medium faint brownish yellow (10YR 6/6) mottles; moderate medium subangular blocky structure; friable; few fine roots; few fine pores; about 5 percent, by volume, ironstone pebbles; strongly acid; gradual smooth boundary.

Bt2—31 to 43 inches; yellowish brown (10YR 5/6) sandy clay loam; common medium distinct yellowish red (5YR 5/6) mottles; about 3 percent, by volume, lenses of light yellowish brown (10YR 6/4) glossic material; moderate medium prismatic structure parting to moderate medium subangular blocky; friable; few fine roots; few fine pores; few thin patchy clay films on faces of peds; about 5 percent, by volume, ironstone pebbles; about 1 percent, by volume, nodules of plinthite; very strongly acid; gradual smooth boundary.

Bt3—43 to 61 inches; mottled brownish yellow (10YR 6/8) and red (2.5YR 4/8) sandy clay loam; few medium prominent light brownish gray (10YR 6/2) mottles; few lenses of pale brown (10YR 6/3) glossic material; weak medium prismatic structure parting to moderate medium subangular blocky; friable; few fine roots; few fine pores; few fine patchy clay films on faces of peds; about 5 percent, by volume, ironstone pebbles; very strongly acid; gradual smooth boundary.

BC—61 to 80 inches; mottled brownish yellow (10YR 6/8) and red (2.5YR 4/8) sandy clay loam; few medium distinct light brownish gray (10YR 6/2) and few medium distinct dark yellowish brown (10YR 4/6) mottles; weak coarse subangular blocky structure; friable; few fine roots; few fine pores; few fine patchy clay films on faces of peds; few fine ironstone pebbles; about 1 percent, by volume, nodular plinthite; very strongly acid.

The solum ranges from 60 to more than 80 inches in thickness. The control section ranges from 20 to 30 percent clay and from 35 to 50 percent sand coarser than very fine sand.

The A horizon is yellowish brown, brown, or dark yellowish brown. Reaction is very strongly acid or strongly acid in unlimed areas.

The E horizon is brown, yellowish brown, light yellowish brown, very pale brown, or strong brown.

The Bt horizon is yellowish brown, brownish yellow, pale brown, strong brown, or yellowish red. Few to many, fine or medium mottles in shades of brown, yellow, or red may occur in this horizon. Some pedons have mottles in shades of gray in the lower part. Some pedons have a mottled matrix with the same colors. The texture is sandy clay loam, clay loam, or fine sandy loam. The content of clay ranges from 15 to 30 percent. Pockets, lenses, interfingers, and coatings of E material

along faces of peds make up 0 to less than 5 percent of the volume. The content of plinthite is less than 5 percent, by volume. Reaction ranges from extremely acid to strongly acid.

The BC horizon, if it occurs, has a mottled matrix of light gray, light brownish gray, yellowish brown, brownish yellow, strong brown, yellowish red, reddish brown, or red. Some pedons have mottles in shades of gray or red. The texture is sandy clay loam, clay loam, or fine sandy loam. The content of clay ranges from 15 to 30 percent. Pockets, lenses, interfingers, and coatings of E material along faces of peds make up 0 to 2 percent of the volume. Some pedons have 20 to 30 percent, by volume, weakly consolidated sandstone or shale. Reaction is extremely acid or very strongly acid.

The C horizon, if it occurs, is brownish yellow. Few or common, fine or medium mottles in shades of gray or red may occur in this horizon. The texture is clay loam, sandy clay loam, or fine sandy loam. The content of clay ranges from 15 to 30 percent. Reaction is extremely acid or very strongly acid.

Wolfpen Series

The Wolfpen series consists of very deep soils on uplands. These soils are well drained and moderately permeable. They formed in sandy and loamy deposits of Carrizo Sand. Slopes range from 2 to 15 percent. The soils of the Wolfpen series are loamy, siliceous, thermic Arenic Paleudalfs.

Typical pedon of Wolfpen loamy fine sand, 2 to 5 percent slopes; from the intersection of U.S. Highways 59 and 80 in Marshall, 17.6 miles west on U.S. Highway 80, about 1.5 miles south on Loop 281, about 1.7 miles east on a county road, and 65 feet south in a native pasture:

A—0 to 4 inches; dark brown (10YR 4/3) loamy fine sand; weak medium granular structure; very friable; many fine and few medium roots; few fine pores; medium acid; clear smooth boundary.

E1—4 to 9 inches; brown (10YR 5/3) loamy fine sand; weak coarse subangular blocky structure; very friable; common fine roots; few fine pores; strongly acid; clear smooth boundary.

E2—9 to 35 inches; very pale brown (10YR 7/3) loamy fine sand; common medium faint pale brown (10YR 6/3) and light yellowish brown (10YR 6/4) mottles; weak coarse subangular blocky structure; very friable; few fine roots; few fine pores; few thin discontinuous lamellae in the lower part; strongly acid; clear smooth boundary.

Bt1—35 to 44 inches; light yellowish brown (10YR 6/4) sandy clay loam; common coarse faint yellowish brown (10YR 5/6) and brownish yellow (10YR 6/6) mottles; moderate medium subangular blocky structure; friable; few fine roots; few fine pores; few thin patchy clay films; strongly acid; clear smooth boundary.

Bt2—44 to 50 inches; light yellowish brown (10YR 6/4) fine sandy loam; common medium faint yellowish brown (10YR 5/6) and brownish yellow (10YR 6/6) mottles; moderate medium subangular blocky structure; friable; few fine roots; few fine pores; few thin patchy clay films; few thin skeletans; strongly acid; abrupt smooth boundary.

Bt/E—50 to 66 inches; brownish yellow (10YR 6/6) fine sandy loam (Bt); few medium distinct yellowish brown (10YR 5/8) and strong brown (7.5YR 5/8) mottles; weak medium subangular blocky structure; friable; few fine roots; few fine pores; few thin patchy clay films; about 15 percent, by volume, light yellowish brown (10YR 6/4) skeletans and interfingers (E); strongly acid; clear smooth boundary.

BCt—66 to 80 inches; mottled light gray (10YR 7/2), reddish yellow (7.5YR 6/6), and pale brown (10YR 6/3) fine sandy loam; common fine distinct brownish yellow (10YR 6/6) mottles; few fine roots; few fine pores; few thin patchy clay films; few fine brittle bodies; strongly acid.

The solum ranges from 60 to more than 80 inches in thickness. The combined thickness of the A and E horizons ranges from 20 to 40 inches. The content of clay in the control section ranges from 18 to 30 percent.

The A horizon is dark brown, brown, dark grayish brown, or grayish brown. Reaction ranges from strongly acid to slightly acid in unlimed areas.

The E horizon is brown, light yellowish brown, very pale brown, light gray, yellowish brown, or pale brown. Reaction ranges from strongly acid to slightly acid in unlimed areas.

The Bt horizon generally is light yellowish brown, strong brown, yellowish brown, or brownish yellow. It has no mottles or has few to many mottles in shades of red, brown, or yellow. In some pedons the lower part of this horizon is yellowish red or has a mottled matrix in shades of red, gray, brown, or yellow. The texture is sandy clay loam, clay loam, loam, or fine sandy loam. This horizon has few to about 15 percent, by volume, skeletans. Reaction ranges from very strongly acid to medium acid.

The BC horizon, if it occurs, has colors in shades of gray, brown, red, or yellow. Some pedons have a mottled matrix with these colors. The texture is fine sandy loam, clay loam, or sandy clay loam. Reaction is very strongly acid or strongly acid.

Formation of the Soils

This section relates the factors of soil formation to the soils in the county. It also describes the surface geology of the county.

Factors of Soil Formation

Soil forms through processes acting on geologic material over time *(7)*. The characteristics of a soil at any given point are determined by the physical and mineral composition of the parent material; the climate under which the parent material accumulated and has existed since accumulation; the plant and animal life on and in the soil; the relief, or lay of the land; and the length of time that the forces of soil formation have acted on the soil material. All of these factors are important in the formation of any soil, but the influence of each varies from place to place.

Parent Material

Parent material is the unconsolidated mass in which a soil forms. It determines the chemical and mineral composition of the soil. The parent material in Harrison County consists of unconsolidated, sandy, loamy, and clayey sediments deposited by water during the Eocene, Pleistocene, and Holocene Epochs. The Eocene Deposits are the Wilcox Group, Carrizo Sand, the Reklaw Formation, Queen City Sand, the Weches Formation, and Sparta Sand. The Pleistocene deposits are the sediments on the different fluviatile terrace levels in areas along the Sabine River and the major bayous. The Holocene deposits include the recent alluvial material on bottom land along the Sabine River, along the bayous, and along the smaller streams in the county. The soils that formed in these kinds of parent material are identified in the section "Surface Geology."

Climate

Harrison County has a warm, moist, humid, subtropical climate that is characterized by heavy rains. Summers are hot and humid. Winters are mild but well defined. Seasonal changes are gradual. A detailed discussion of the climate is given in the section "General Nature of the County."

The climate under which the soils in the county formed greatly influenced their formation. Because of warm average temperatures, high humidity, and the amount of rainfall, most of the soils on uplands are strongly weathered, leached, and acidic. Most of the differences among the soils in the county, however, cannot be attributed to the climate, which has been relatively uniform throughout the county. Differences in the degree of weathering and leaching and in the translocation of clay are caused chiefly by variations in all of the soil-forming factors.

Plant and Animal Life

Living organisms significantly influence the kind and extent of horizonation in the soil. Plants, burrowing animals, earthworms, insects, micro-organisms, and human activities directly influence soil formation. Gains in organic matter and nitrogen in the soil, gains or losses in plant nutrients, and changes in structure and porosity are caused by plant and animal life.

The growth of plants and the activity of other organisms physically disturb the soil, modifying the porosity of the soil and influencing the formation of structure and the incorporation of organic matter. The growth and eventual death and decomposition of plants recycle nutrients from the soil to the plant and back to the soil. The decomposition and incorporation of organic matter by micro-organisms enhance the development of soil structure and generally increase the rate of water infiltration and available water capacity of the soil.

The natural vegetation throughout the county was mixed hardwoods and pine. The soils that form under trees accumulate organic matter in the upper few inches and are light in color. These characteristics are quickly destroyed, however, when the soils are cultivated.

Earthworms, crawfish, and burrowing rodents help to mix the material within the soil. Earthworms are numerous in the soil. They hasten the decay of organic matter and enhance the movement of air, water, and plant nutrients. Crawfish are most numerous in areas where the soils have clayey layers and runoff is slow. They bring soil material from the lower layers to the surface. Burrowing animals, such as gophers, help to

mix and aerate loamy soils, such as Bowie and Bernaldo soils.

Fungi, bacteria, and other micro-organisms help to break down organic matter and improve fertility. Aerobic organisms use oxygen from the air and are chiefly responsible for the decomposition of organic matter through rapid oxidation of organic residue. These organisms are most abundant in the better drained and aerated soils and prevail for longer periods in those soils than in the more poorly drained soils. Anaerobic organisms are dominant for longer periods during the year in the more poorly drained soils than in the better drained soils. These organisms do not require oxygen from the air, and they break down organic residue very slowly. In general, the content of organic matter broken down by these organisms is higher where the soils are more poorly drained and are not well aerated.

Human activities also have affected soil formation. Areas of native and introduced grasses have been overgrazed by livestock. In areas that have been tilled, the content of organic matter has been reduced and plowpans have formed. Construction and excavation activities also alter soil formation. They include the mining of lignite and the reconstruction of previously mined soils. After reconstruction, the processes of soil formation begin all over again.

Relief

Relief influences soil formation through its effect on drainage, runoff, erosion, decomposition, and the penetration of soil moisture. The influence of relief on the soils in Harrison County is especially evident in the rate at which water runs off the surface and in the internal soil drainage. In areas of Guyton, Mollville, and other nearly level, poorly drained soils, relief has a great influence on the depth to a seasonal high water table and the length of the period when the water table is high.

The topography of the county ranges from nearly level to hilly. Soil formation depends largely on the depth of the soil and the penetration of soil moisture. Frequent wetting and drying cycles generally result in distinct soil horizons.

Nearly level soils tend to differ markedly from the more sloping soils. Nearly level soils that are poorly drained and that remain saturated much of the time generally do not have pronounced soil horizons.

As the slope increases, the depth of water penetration and the degree of soil formation decrease. For example, the moderately steep Cuthbert soils have a solum that is thinner than that of the nearby gently sloping Bowie soils because water runs off the steeper slopes more rapidly and less moisture infiltrates the soils. Also, the plant cover generally is thinner on the steeper slopes. As a result, the effects of vegetation on soil formation are less pronounced. Many of the steeper soils are eroded almost as quickly as they form.

Time

A great length of time is required for the formation of soils that have distinct horizons. The effects of time are modified by the other four factors of soil formation.

The soils in Harrison County formed in material deposited during three or more geologic periods. Recent alluvium is the parent material of the youngest soils. The older alluvium, which is of late Pleistocene age, is on terraces. Sediment deposited during the Tertiary Period is the parent material of most of the soils on uplands. It was deposited 40 to 60 million years ago and is the oldest parent material in the county.

In general, soils characterized by very little horizon development are young, or immature. Soils that have well defined horizons are old, or mature. The soils in Harrison County range from young to old. Bibb, Iuka, and Mantachie are young soils on flood plains. They have faint horizons. Bernaldo and Latch soils are on stream terraces. They are of intermediate age and have not undergone maximum profile development. Unlike many of the older soils in the uplands, they have not been leached of bases. Bowie, Kirvin, and Lilbert are mature soils in the uplands. They have been leached of bases. They have distinct horizons showing little resemblance to the original parent material.

Surface Geology

Homer Logan, geologist, Soil Conservation Service, helped prepare this section.

Harrison County is in the West Gulf Coastal Plain Physiographic Province. Wide lowlands along the Sabine River, the Big Cypress Bayou, and the Little Cypress Bayou extend easterly along the major drainageways. Elevation ranges from about 570 feet on the Little Cypress-Sabine drainage divide to about 170 feet along the shores of Caddo Lake. It commonly is 300 to 400 feet throughout the county. The eastern part of the county generally is nearly level or gently undulating. The central part generally is gently undulating to rolling. The western part is gently undulating to hilly. The alluvial areas along the major streams, rivers, and bayous are nearly level.

The main sources of fresh ground water in Harrison County are the Carrizo-Wilcox and Queen City-Reklaw aquifers. These aquifers probably are interconnected hydraulically. They are known as the Cypress basin and the Sabine basin. They receive most of their ground-

water recharge from rainwater infiltrating the formations in their respective outcrop areas. The lower aquifers also receive some recharge from the overlying formations and from streams crossing the outcrops.

The Carrizo-Wilcox aquifer is stratigraphically the lowest, largest, and most productive of the two. The quality of the water is generally very good, though the content of dissolved solids increases with increasing depth and the content of iron is moderate. Yields of ground water from the Queen City-Reklaw aquifer are limited. The aquifer is recharged from its outcrop area in the central and western parts of the county. Both aquifers feed numerous springs and creeks throughout the county. Many factors may have a significant impact on the continued suitability and availability of the ground water. In areas where the aquifers are at or near the surface, these factors include land use, such as landfills and sewage disposal, and land management, such as applications of pesticide and fertilizer and cropping methods. Other factors affecting the quality of the ground water include oil well maintenance, oil spillage, and brine disposal.

The Sabine Uplift is a prominent feature in the county. It is a relatively flat-topped structural high centering near the Sabine River, at the Texas-Louisiana boundary. It partly separates the East Texas Embayment from the larger Mississippi Embayment to the east. The surface of the Sabine Uplift consists of an inlier of Wilcox rocks surrounded by younger Claiborne rocks. The dip of the rock units is generally radial, away from the central part of the uplift.

The surface geologic formations in Harrison County range in age from Eocene to Holocene. They crop out in northeasterly trending belts *(16)*. The rocks dip in a southeast direction toward the axis of the East Texas basin, which extends northeasterly and lies on the edge of the county. This troughlike depression is part of an extensive downwarp or embayment. The Sabine Uplift has significantly influenced soil formation in the county. It lies near the Louisiana border and southeastern Harrison County and radiates outward. The Coastal Plain sediments in the uplands were deposited when the Gulf of Mexico covered the area in successive periods. Meanwhile, riverine sediments were intermittently deposited on top of deltaic deposits.

The oldest geologic materials on the surface in the county are those of the Wilcox Group of Eocene age. This group is the dominant surface exposure, occupying the eastern part of the county. The sediments were deposited 40 to 60 million years ago. This group is as much as 1,000 feet thick. It consists of fine and medium, crossbedded sand, shale, clay, lignite, and some minor or locally significant amounts of siderite, pyrite, and glauconite. The deposition of alluvium and the accumulation of pedisediments during the Pleistocene may have contributed to a thin layer of loamy sediments, which mantles much of the county. The soils commonly in the Scottsville and Eastwood general soil map units formed in deposits of the Wilcox Group.

Except for Pleistocene and Recent materials, the rest of the geologic materials on the surface of Harrison County also are of Eocene age. They are from the Claiborne Group. They are described in sequence from older to younger in the following paragraphs.

Carrizo Sand overlies the Wilcox Group. It crops out in small, sinuous, narrow bands on the outer edge of the Sabine Uplift, in the north-central and southwestern parts of the county. Carrizo Sand is as much as 100 feet thick. It is made up of fine and medium sand, small amounts of silt and clay, and interbeds of indurated ironstone. The major soils that formed in Carrizo Sand are those of the Darden, Wolfpen, Pickton, and Bernaldo series. These soils are mainly in the Lilbert-Warnock-Wolfpen general soil map unit.

The Reklaw Formation overlies Carrizo Sand. It crops out in large areas in the north-central and southwestern parts of the county. This formation has a maximum thickness of about 100 feet. It typically consists of micaceous clay and minor amounts of sand and silt. Ironstone seams and ironstone pebbles are at or near the surface. The soils commonly in the Cuthbert-Bowie-Kirvin general soil map unit formed in deposits of the Reklaw Formation.

Queen City Sand overlies the Reklaw Formation. It crops out in large areas in the western and northwestern parts of the county. It is about 100 to 200 feet thick. It consists of fine and medium quartz sand; minor amounts of shale, silt, clay, and impure lignite; and some interbeds of indurated ironstone. The major soils that formed in Queen City Sand are those of the Bowie, Darco, Darden, Lilbert, and Warnock series. These soils are mainly in the Lilbert-Warnock-Wolfpen general soil map unit.

The Weches Formation overlies Queen City Sand. It is of very limited extent in the county. It occurs as scattered erosional remnants of relatively sharp escarpments, ridges, cuestas, and isolated hills in the western and northwestern parts of the county. It is as much as 70 feet thick. It consists of highly weathered, interbedded clay and some sand. Limonitic and sideritic iron ore is locally mined for gravel in areas of this formation. In some of these mined areas, the only remaining soils are the graded Kirvin soils. The soils that formed in deposits of the Weches Formation are in the Cuthbert-Bowie-Kirvin general soil map unit.

Sparta Sand overlies the Weches Formation. It is of very limited extent in the county. It is on the gently

undulating top and rolling side slopes of the Weches escarpments. It consists mainly of fine grained quartz sand and interbeds of sandy clay. The major soils that formed in Sparta Sand are those of the Lilbert series. Small areas of these soils are in the Cuthbert-Bowie-Kirvin general soil map unit.

The next to the youngest of the geologic materials in the county are Pleistocene-aged Quaternary fluviatile terrace deposits. They consist of sand, silt, and clay. They are 6 to 30 feet thick. They are about 2 to 25 feet higher than the present-day flood plains. Remnants of the older terraces are on upland stream divides and side slopes that are as high as 25 to 200 feet above the present-day flood plains. The Sabine Uplift played a major role in preserving these relict terraces. The present streams that drain the uplands are flanked by paired terraces that parallel the streams. Many of the soils on the terraces are mounded and have been reworked by wind and water. The soils in the Latch-Mollville and the Bernaldo general soil map units are among the soils that formed in these ancient alluvial deposits.

The youngest geologic materials in the county are recent alluvial sediments of Holocene age. They were deposited by modern streams. The soils in the Iuka-Socagee-Sardis general soil map unit are mainly along the smaller streams, in areas where the sediments are a mixture of loamy material. The soils in the Estes-Mooreville general soil map unit are the most common soils along the rivers. The sediments along the Sabine River are made up mainly of clay and some loamy material along overflow banks and in old oxbows.

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Glossary

ABC soil. A soil having an A, a B, and a C horizon.

AC soil. A soil having only an A and a C horizon. Commonly, such soil formed in recent alluvium or on steep, rocky slopes.

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as:

Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	more than 12

Base saturation. The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K), expressed as a percentage of the total cation-exchange capacity.

Bedding planes. Fine stratifications, less than 5 millimeters thick, in unconsolidated alluvial, eolian, lacustrine, or marine sediments.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bottom land. The normal flood plain of a stream, subject to flooding.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

Capillary water. Water held as a film around soil particles and in tiny spaces between particles. Surface tension is the adhesive force that holds capillary water in the soil.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity but is more precise in meaning.

Chiseling. Tillage with an implement having one or more soil-penetrating points that shatter or loosen hard, compacted layers to a depth below normal plow depth.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Claypan. A slowly permeable soil horizon that contains much more clay than the horizons above it. A claypan is commonly hard when dry and plastic or stiff when wet.

Climax vegetation. The stabilized plant community on a particular site. The plant cover reproduces itself and does not change so long as the environment remains the same.

Coarse fragments. If round, mineral or rock particles 2 millimeters to 25 centimeters (10 inches) in diameter; if flat, mineral or rock particles (flagstone) 15 to 38 centimeters (6 to 15 inches) long.

Coarse textured soil. Sand or loamy sand.

Cobblestone (or cobble). A rounded or partly rounded fragment of rock 3 to 10 inches (7.6 to 25 centimeters) in diameter.

Colluvium. Soil material, rock fragments, or both moved by creep, slide, or local wash and deposited at the base of steep slopes.

Complex slope. Irregular or variable slope. Planning or establishing terraces, diversions, and other water-control structures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils are somewhat similar in all areas.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Conservation tillage. A tillage system that does not invert the soil and that leaves a protective amount of crop residue on the surface throughout the year.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are:

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard; little affected by moistening.

Contour stripcropping. Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Deferred grazing. Postponing grazing or resting grazing land for a prescribed period.

Dense layer (in tables). A very firm, massive layer that has a bulk density of more than 1.8 grams per cubic centimeter. Such a layer affects the ease of digging and can affect filling and compacting.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically they are wet long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum or periodically receive high rainfall, or both.

Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients.

Drainage, surface. Runoff, or surface flow of water, from an area.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

Eolian soil material. Earthy parent material accumulated through wind action; commonly refers to sandy material in dunes or to loess in blankets on the surface.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of human or animal activities or of a catastrophe in nature, such as fire, that exposes the surface.

Erosion pavement. A layer of gravel or stones that remains on the surface after fine particles are removed by sheet or rill erosion.

Excess fines (in tables). Excess silt and clay in the soil. The soil is not a source of gravel or sand for construction purposes.

Fallow. Cropland left idle in order to restore productivity through accumulation of moisture. Summer fallow is common in regions of limited rainfall where cereal grains are grown. The soil is tilled for at least one growing season for weed control and decomposition of plant residue.

Fast intake (in tables). The movement of water into the soil is rapid.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity, normal moisture capacity,* or *capillary capacity.*

Fine textured soil. Sandy clay, silty clay, or clay.

First bottom. The normal flood plain of a stream, subject to frequent or occasional flooding.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Foot slope. The inclined surface at the base of a hill.

Forb. Any herbaceous plant that is not a grass or a sedge.

Fragipan. A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restricts roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than to deform slowly.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Gilgai. Commonly, a succession of microbasins and microknolls in nearly level areas or of microvalleys and microridges parallel with the slope. Typically, the microrelief of clayey soils that shrink and swell considerably with changes in moisture content.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors and mottles.

Graded stripcropping. Growing crops in strips that grade toward a protected waterway.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock up to 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that is 15 to 50 percent, by volume, rounded or angular rock fragments, not prominently flattened, up to 3 inches (7.6 centimeters) in diameter.

Green manure crop (agronomy). A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

Ground water (geology). Water filling all the unblocked pores of the material below the water table.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Hardpan. A hardened or cemented soil horizon, or layer. The soil material is sandy, loamy, or clayey and is cemented by iron oxide, silica, calcium carbonate, or other substance.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the "Soil Survey Manual." The major horizons of mineral soil are as follows:

O horizon.—An organic layer of fresh and decaying plant residue at the surface of a mineral soil.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon.—The mineral horizon below an O, A, or E horizon. The B horizon is, in part, a layer of transition from the overlying horizon to the underlying C horizon. The B horizon also has distinctive characteristics, such as accumulation of clay, sesquioxides, humus, or a combination of these; prismatic or blocky structure; redder or browner colors than those in the A horizon; or a combination of these. The combined A and B horizons are generally called the solum, or true soil. If a soil does not have a B horizon, the A horizon alone is the solum.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the A or B horizon. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, the Arabic numeral 2 precedes the letter C.

Cr layer.—Soft, consolidated bedrock beneath the soil.

R layer.—Consolidated rock (unweathered bedrock) beneath the soil. The bedrock commonly underlies a C horizon but can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Infiltration. The downward entry of water into the immediate surface of soil or other material. This contrasts with percolation, which is movement of water through soil layers or material.

Infiltration capacity. The maximum rate at which water can infiltrate into a soil under a given set of conditions.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Intake rate. The average rate of water entering the soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time. Therefore, intake rate for design purposes is not a constant but is a variable depending on the net irrigation application. The rate of water intake, in inches per hour, is expressed as follows:

Less than 0.2	very low
0.2 to 0.4	low
0.4 to 0.75	moderately low
0.75 to 1.25	moderate
1.25 to 1.75	moderately high
1.75 to 2.5	high
More than 2.5	very high

Ironstone. Indurated material formed through secondary precipitation of ferric oxides, commonly goethite and hematite. Ironstone that contains glauconitic pellets pseudomorphically replaced by ferric iron oxides is called glauconitic ironstone.

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are:

Basin.—Water is applied rapidly to nearly level plains surrounded by levees or dikes.

Border.—Water is applied at the upper end of a strip in which the lateral flow of water is controlled by small earth ridges called border dikes, or borders.

Controlled flooding.—Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.

Corrugation.—Water is applied to small, closely spaced furrows or ditches in fields of close-growing crops or in orchards so that it flows in only one direction.

Drip (or trickle).—Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.

Furrow.—Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.

Sprinkler.—Water is sprayed over the soil surface through pipes or nozzles from a pressure system.

Subirrigation.—Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.

Wild flooding.—Water, released at high points, is allowed to flow onto an area without controlled distribution.

Lacustrine deposit (geology). Material deposited in lake water and exposed when the water level is lowered or the elevation of the land is raised.

Leaching. The removal of soluble material from soil or other material by percolating water.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loess. Fine grained material, dominantly of silt-sized particles, deposited by wind.

Low strength. The soil is not strong enough to support loads.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Moderately coarse textured soil. Coarse sandy loam, sandy loam, or fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, or silty clay loam.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few, common,* and *many*; size—*fine, medium,* and *coarse*; and contrast—*faint, distinct,* and *prominent.* The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium,* from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse,* more than 15 millimeters (about 0.6 inch).

Munsell notation. A designation of color by degrees of three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color that has hue of 10YR, value of 6, and chroma of 4.

Neutral soil. A soil having a pH value between 6.6 and 7.3. (See Reaction, soil.)

Nutrient, plant. Any element taken in by a plant

essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

Pan. A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan, fragipan, claypan, plowpan,* and *traffic pan.*

Parent material. The unconsolidated organic and mineral material in which soil forms.

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil adversely affects the specified use.

Permeability. The quality of the soil that enables water to move through the profile. Permeability is measured as the number of inches per hour that water moves through the saturated soil. Terms describing permeability are:

Very slow	less than 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management. For example, slope, stoniness, and thickness.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Subsurface tunnels or pipelike cavities are formed by water moving through the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Plinthite. The sesquioxide-rich, humus-poor, highly weathered mixture of clay with quartz and other diluents. It commonly appears as red mottles, usually in platy, polygonal, or reticulate patterns. Plinthite changes irreversibly to an ironstone hardpan or to irregular aggregates on repeated wetting and drying, especially if it is exposed also to heat from the sun. In a moist soil, plinthite can be cut with a spade. It is a form of laterite.

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poor filter (in tables). Because of rapid permeability, the soil may not adequately filter effluent from a waste disposal system.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Reaction, soil. A measure of the acidity or alkalinity of a soil expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity, expressed as pH values, are:

Ultra acid	below 3.6
Extremely acid	3.6 to 4.4
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Regolith. The unconsolidated mantle of weathered rock and soil material on the earth's surface; the loose earth material above the solid rock.

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum (residual soil material). Unconsolidated, weathered or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

Rill. A steep-sided channel resulting from accelerated

erosion. A rill is generally a few inches deep and not wide enough to be an obstacle to farm machinery.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rooting depth (in tables). A shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone. Sedimentary rock containing dominantly sand-sized particles.

Saprolite (soil science). Unconsolidated, residual material underlying the soil and grading to hard bedrock below.

Sedimentary rock. Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.

Seepage (in tables). The movement of water through the soil adversely affects the specified use.

Sequum. A sequence consisting of an illuvial horizon and the overlying eluvial horizon. (See Eluviation.)

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the substratum. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Shale. Sedimentary rock formed by the hardening of a clay deposit.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silica. A combination of silicon and oxygen. The mineral form is called quartz.

Silica-sesquioxide ratio. The ratio of the number of molecules of silica to the number of molecules of alumina and iron oxide. The more highly weathered soils or their clay fractions in warm-temperate, humid regions, and especially those in the tropics, generally have a low ratio.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Siltstone. Sedimentary rock made up of dominantly silt-sized particles.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

Slickensides. Polished and grooved surfaces produced by one mass sliding past another. In soils, slickensides may occur at the bases of slip surfaces on the steeper slopes; on faces of blocks, prisms, and columns; and in swelling clayey soils, where there is marked change in moisture content.

Slick spot. A small area of soil having a puddled, crusted, or smooth surface and an excess of exchangeable sodium. The soil is generally silty or clayey, is slippery when wet, and is low in productivity.

Slippage (in tables). The soil mass is susceptible to movement downslope when loaded, excavated, or wet.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slope (in tables). Slope is great enough that special practices are required to ensure satisfactory performance of the soil for a specific use.

Slow intake (in tables). The slow movement of water into the soil.

Slow refill (in tables). The slow filling of ponds, resulting from restricted permeability in the soil.

Small stones (in tables). Rock fragments less than 3 inches (7.6 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Sodicity. The degree to which a soil is affected by exchangeable sodium. Sodicity is expressed as a sodium absorption ratio (SAR) of a saturation extract, or the ratio of Na^{+} to Ca^{++} + Mg^{++}. The degrees of sodicity and their respective ratios are:

Slight	less than 13:1
Moderate	13-30:1
Strong	more than 30:1

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the substratum. The living roots and plant and animal activities are largely confined to the solum.

Stone line. A concentration of coarse fragments in a soil. Generally, it is indicative of an old weathered surface. In a cross section, thickness of the line can be one fragment or more. It generally overlies material that weathered in place, and it is overlain by recent sediment of variable thickness.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter if rounded or 15 to 24 inches (38 to 60 centimeters) in length if flat.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Stripcropping. Growing crops in a systematic arrangement of strips or bands that provide vegetative barriers to soil blowing and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grain* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Stubble mulch. Stubble or other crop residue left on the soil or partly worked into the soil. It protects the soil from soil blowing and water erosion after harvest, during preparation of a seedbed for the next crop, and during the early growing period of the new crop.

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsoiling. Breaking up a compact subsoil by pulling a special chisel through the soil.

Substratum. The part of the soil below the solum.

Subsurface layer. Technically, the E horizon. Generally refers to a leached horizon lighter in color and lower in organic matter content than the overlying surface layer.

Summer fallow. The tillage of uncropped land during the summer to control weeds and allow storage of moisture in the soil for the growth of a later crop. A practice common in semiarid regions, where annual precipitation is not enough to produce a crop every year. Summer fallow is frequently practiced before planting winter grain.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Terrace. An embankment, or ridge, constructed on the contour or at a slight angle to the contour across sloping soils. The terrace intercepts surface runoff, so that water soaks into the soil or flows slowly to a prepared outlet.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer (in tables). An otherwise suitable soil material that is too thin for the specified use.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toe slope. The outermost inclined surface at the base of a hill; part of a foot slope.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Trace elements. Chemical elements, such as zinc, cobalt, manganese, copper, and iron, in soils in extremely small amounts. They are essential to plant growth.

Unstable fill (in tables). There is a risk of caving or sloughing on banks of fill material.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Variegation. Refers to patterns of contrasting colors that are assumed to be inherited from the parent material rather than to be the result of poor drainage.

Weathered glauconitic material. A mixture of olive yellow, yellow, or red, incoherent or weakly consolidated sandy, silty, or clayey material containing glauconite pellets of similar color. The matrix is not calcareous, and shell forms, if they occur, are pseudomorphs. Carbonates are replaced by other material.

Weathering. All physical and chemical changes produced by atmospheric agents in rocks or other deposits at or near the earth's surface. These changes result in disintegration and decomposition of the material.

Well graded. Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Wilting point (or permanent wilting point). The moisture content of soil, on an ovendry basis, at which a plant (specifically a sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

Tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

(Recorded in the period 1951-84 at Marshall, Texas)

Month	Temperature: Average daily maximum	Temperature: Average daily minimum	Temperature: Average daily	Temperature: 2 years in 10 will have-- Maximum temperature higher than--	Temperature: 2 years in 10 will have-- Minimum temperature lower than--	Temperature: Average number of growing degree days*	Precipitation: Average	Precipitation: 2 years in 10 will have-- Less than--	Precipitation: 2 years in 10 will have-- More than--	Precipitation: Average number of days with 0.10 inch or more	Precipitation: Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January-----	54.7	33.0	43.9	79	9	61	3.95	1.45	5.81	6	0.8
February----	59.6	36.8	48.2	82	16	109	3.86	2.08	5.29	6	.3
March-------	67.2	43.4	55.3	85	23	218	3.91	2.10	5.35	6	.2
April-------	76.2	52.9	64.6	89	33	438	4.87	2.18	7.13	6	.0
May---------	83.0	60.5	71.8	93	44	676	5.15	2.54	7.37	6	.0
June--------	89.8	67.8	78.8	98	52	864	3.82	1.17	5.72	5	.0
July--------	93.8	71.5	82.7	102	61	1,014	3.23	1.25	4.76	5	.0
August------	93.7	70.4	82.1	102	58	995	2.47	.77	3.85	4	.0
September---	88.0	64.3	76.2	98	46	786	3.96	1.67	5.43	5	.0
October-----	78.7	52.0	65.4	93	34	477	3.37	.92	5.33	4	.0
November----	66.7	42.3	54.5	84	23	173	3.86	1.94	5.43	6	.0
December----	58.1	35.3	46.7	79	15	76	4.45	1.77	6.50	7	.2
Yearly:											
Average---	75.8	52.5	64.2	---	---	---	---	---	---	---	---
Extreme---	---	---	---	103	9	---	---	---	---	---	---
Total-----	---	---	---	---	---	5,887	46.90	37.97	55.01	66	1.5

* A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (50 degrees F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL

(Recorded in the period 1951-84 at Marshall, Texas)

Probability	Temperature		
	24 °F or lower	28 °F or lower	32 °F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	Mar. 16	Mar. 21	Apr. 8
2 years in 10 later than--	Mar. 4	Mar. 15	Apr. 1
5 years in 10 later than--	Feb. 9	Mar. 4	Mar. 19
First freezing temperature in fall:			
1 year in 10 earlier than--	Nov. 15	Nov. 4	Oct. 24
2 years in 10 earlier than--	Nov. 23	Nov. 12	Oct. 30
5 years in 10 earlier than--	Dec. 9	Nov. 25	Nov. 11

TABLE 3.--GROWING SEASON

(Recorded in the period 1951-84 at Marshall, Texas)

Probability	Daily minimum temperature during growing season		
	Higher than 24 °F	Higher than 28 °F	Higher than 32 °F
	Days	Days	Days
9 years in 10	263	240	207
8 years in 10	275	249	217
5 years in 10	298	266	236
2 years in 10	324	283	254
1 year in 10	351	292	264

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
BaB	Bernaldo fine sandy loam, 1 to 3 percent slopes	30,420	5.2
Bb	Bibb silt loam, frequently flooded	4,713	0.8
BeB	Bienville loamy fine sand, 1 to 3 percent slopes	1,895	0.3
BnA	Bonn-Cart complex, 0 to 1 percent slopes	2,295	0.4
BoC	Bowie very fine sandy loam, 2 to 5 percent slopes	53,493	9.1
CbE	Cuthbert fine sandy loam, 5 to 15 percent slopes	43,404	7.4
CgE	Cuthbert gravelly fine sandy loam, 5 to 15 percent slopes	20,840	3.6
CgF	Cuthbert gravelly fine sandy loam, 15 to 35 percent slopes	1,925	0.3
Cy	Cypress clay loam, submerged	2,141	0.4
DbC	Darbonne fine sandy loam, 3 to 5 percent slopes	2,264	0.4
DcC	Darco loamy fine sand, 2 to 5 percent slopes	1,725	0.3
DcE	Darco loamy fine sand, 8 to 15 percent slopes	786	0.1
DrC	Darden fine sand, 1 to 5 percent slopes	1,725	0.3
DrE	Darden fine sand, 5 to 15 percent slopes	709	0.1
EaC	Eastwood very fine sandy loam, 1 to 5 percent slopes	28,511	4.9
EaE	Eastwood very fine sandy loam, 5 to 20 percent slopes	33,408	5.7
EbB	Elrose fine sandy loam, 1 to 3 percent slopes	4,790	0.8
EcA	Erno-Cart complex, 0 to 2 percent slopes	6,007	1.0
Es	Estes clay, occasionally flooded	4,960	0.8
GcA	Guyton-Cart complex, 0 to 1 percent slopes	12,492	2.1
Iu	Iuka fine sandy loam, frequently flooded	30,297	5.2
KfC	Kirvin very fine sandy loam, 2 to 5 percent slopes	15,233	2.6
KgC	Kirvin gravelly fine sandy loam, 2 to 5 percent slopes	18,052	3.1
KsC	Kirvin soils, graded, 2 to 8 percent slopes	2,403	0.4
LaA	Latch-Mollville complex, 0 to 1 percent slopes	5,314	0.9
LeB	Latex fine sandy loam, 1 to 3 percent slopes	16,481	2.8
LtC	Lilbert loamy fine sand, 2 to 5 percent slopes	15,911	2.7
MaG	Maben very fine sandy loam, 20 to 40 percent slopes	477	0.1
MbB	Marklake fine sandy loam, 1 to 3 percent slopes	555	0.1
MbC	Marklake fine sandy loam, 3 to 5 percent slopes	354	0.1
MbE	Marklake sandy clay loam, 12 to 20 precent slopes	167	0.1
McA	Metcalf-Cart complex, 0 to 2 percent slopes	7,840	1.3
MeB	Meth fine sandy loam, 1 to 3 percent slopes	3,758	0.6
Mm	Mooreville-Mantachie complex, frequently flooded	16,404	2.8
Nu	Nugent loam, frequently flooded	216	0.1
PkC	Pickton loamy fine sand, 2 to 5 percent slopes	770	0.1
PkE	Pickton loamy fine sand, 8 to 15 percent slopes	447	0.1
PrB	Pirkey very fine sandy loam, 1 to 3 percent slopes	909	0.2
PrC	Pirkey very fine sandy loam, 3 to 5 percent slopes	1,756	0.3
PrE	Pirkey very fine sandy loam, 8 to 12 percent slopes	508	0.1
Pt	Pits and Dumps	231	0.1
SaC	Sacul very fine sandy loam, 1 to 5 percent slopes	12,384	2.1
Sm	Sardis-Mathiston complex, frequently flooded	22,457	3.8
SrA	Sawyer very fine sandy loam, 0 to 2 percent slopes	12,399	2.1
SvA	Scottsville very fine sandy loam, 0 to 2 percent slopes	87,748	15.1
Sz	Socagee silty clay loam, frequently flooded	10,751	1.8
Ur	Urban land	1,078	0.2
WaE	Warnock loamy fine sand, 8 to 15 percent slopes	17,513	3.0
WoC	Wolfpen loamy fine sand, 2 to 5 percent slopes	8,163	1.4
WoE	Wolfpen loamy fine sand, 8 to 15 percent slopes	7,917	1.4
	Water areas 2 to 40 acres in size	3,188	0.5
	Water areas more than 40 acres in size	4,898	0.8
	Total	585,082	100.0

TABLE 5.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE

(Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil)

Soil name and map symbol	Land capability	Corn	Green peas	Watermelons	Improved bermuda-grass	Common bermuda-grass	Bahiagrass	Tall fescue
		Bu	Bu	Tons	AUM*	AUM*	AUM*	AUM*
BaB------------- Bernaldo	2e	90	---	12.0	11.0	8.0	9.0	---
Bb-------------- Bibb	5w	---	---	---	---	5.5	7.5	6.0
BeB------------- Bienville	2s	80	---	12.0	11.0	7.0	6.5	---
BnA**:								
Bonn-----------	4s	---	---	---	---	4.0	4.0	4.0
Cart-----------	2s	---	---	---	9.0	6.0	7.0	---
BoC------------- Bowie	3e	80	55	10.0	12.0	8.0	9.0	6.0
CbE, CgE-------- Cuthbert	6e	---	---	---	7.0	6.0	6.0	---
CgF------------- Cuthbert	7e	---	---	---	---	---	5.0	---
Cy-------------- Cypress	8w	---	---	---	---	---	---	---
DbC------------- Darbonne	3e	50	---	---	10.0	7.0	7.0	---
DcC------------- Darco	3s	55	---	11.0	7.0	---	---	---
DcE------------- Darco	6e	---	---	---	6.0	---	---	---
DrC------------- Darden	4s	55	35	8.0	6.5	---	---	---
DrE------------- Darden	6e	---	---	---	6.0	---	---	---
EaC------------- Eastwood	4e	---	---	---	7.5	6.0	6.0	---
EaE------------- Eastwood	6e	---	---	---	6.5	5.5	5.5	---
EbB------------- Elrose	2e	85	---	10.0	11.0	7.5	8.0	6.0
EcA**:								
Erno-----------	2e	90	60	12.0	12.0	8.0	9.0	6.0
Cart-----------	2e	70	---	---	10.0	7.0	8.0	6.0
Es-------------- Estes	4w	---	---	---	---	5.0	6.0	4.5

See footnotes at end of table.

TABLE 5.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn	Green peas	Watermelons	Improved bermuda-grass	Common bermuda-grass	Bahiagrass	Tall fescue
		Bu	Bu	Tons	AUM*	AUM*	AUM*	AUM*
GcA:								
Guyton	4w	---	---	---	---	6.0	9.0	---
Cart	2s	65	---	---	---	7.0	8.0	---
Iu Iuka	5w	---	---	---	8.0	6.0	8.0	7.0
KfC Kirvin	3e	75	55	---	9.0	8.0	8.0	---
KgC Kirvin	4e	---	---	---	8.0	7.0	7.0	---
KsC Kirvin	6e	---	---	---	6.0	5.0	5.0	---
LaA**:								
Latch	3s	75	50	11.0	8.0	6.0	6.0	6.0
Mollville	4w	---	---	---	---	7.0	7.0	6.0
LeB Latex	2e	90	65	14.0	11.0	8.0	9.0	6.0
LtC Lilbert	3e	80	50	12.0	8.0	6.0	6.0	---
MaG Maben	7e	---	---	---	---	---	---	---
MbB Marklake	3e	80	55	---	12.0	9.0	9.0	7.0
MbC Marklake	4e	70	50	---	11.0	8.0	8.0	6.0
MbE Marklake	6e	---	---	---	10.0	7.0	7.0	5.0
McA**:								
Metcalf	2w	80	---	---	10.0	6.0	7.0	6.0
Cart	2e	65	---	---	10.0	6.0	7.0	6.0
MeB Meth	2e	80	---	---	12.0	6.0	7.0	6.0
Mm**:								
Mooreville	5w	---	---	---	---	5.0	7.0	7.0
Mantachie	5w	---	---	---	---	6.0	7.0	7.0
Nu Nugent	5w	---	---	---	---	5.0	6.0	4.0
PkC Pickton	3s	65	40	10.0	6.5	---	---	---
PkE Pickton	6e	---	---	---	6.0	---	---	---

See footnotes at end of table.

TABLE 5.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn	Green peas	Watermelons	Improved bermuda-grass	Common bermuda-grass	Bahiagrass	Tall fescue
		Bu	Bu	Tons	AUM*	AUM*	AUM*	AUM*
PrB------------- Pirkey	3e	70	50	---	11.0	8.0	8.0	---
PrC------------- Pirkey	4e	70	50	---	11.0	8.0	8.0	---
PrE------------- Pirkey	6e	---	---	---	10.0	7.0	7.0	---
Pt**. Pits and Dumps								
SaC------------- Sacul	4e	60	---	---	7.5	6.5	6.5	---
Sm**:								
Sardis---------	4w	---	---	---	8.0	6.0	7.0	6.0
Mathiston------	4w	70	---	---	9.0	6.0	8.0	7.0
SrA------------- Sawyer	2e	65	---	---	9.0	7.0	8.0	7.0
SvA------------- Scottsville	2w	85	60	---	11.0	7.0	9.0	7.0
Sz-------------- Socagee	5w	---	---	---	---	5.0	6.0	4.5
Ur** Urban land								
WaE------------- Warnock	6e	---	---	---	8.0	7.0	7.0	---
WoC------------- Wolfpen	3s	80	50	12.0	8.0	6.0	6.0	---
WoE------------- Wolfpen	6e	---	---	---	7.0	5.5	6.0	---

* Animal unit month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.
** See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY

(Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available)

Soil name and map symbol	Ordination symbol	Management concerns					Potential productivity			Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index	Volume*	
BaB---------------- Bernaldo	10A	Slight	Slight	Slight	Slight	Slight	Loblolly pine-------	94	370	Loblolly pine, slash pine, sweetgum.
							Shortleaf pine------	84	326	
							Sweetgum------------	---	---	
							Southern red oak----	---	---	
Bb----------------- Bibb	11W	Slight	Severe	Severe	Moderate	Severe	Loblolly pine-------	103	528	Eastern cottonwood, loblolly pine, sweetgum.
							Sweetgum------------	90	207	
							Water oak-----------	90	207	
							Blackgum------------	---	---	
BeB---------------- Bienville	10S	Slight	Severe	Moderate	Slight	Slight	Loblolly pine-------	92	350	Loblolly pine, shortleaf pine.
							Shortleaf pine------	83	312	
BnA**:										
Bonn---------------	3T	Slight	Severe	Severe	Severe	Moderate	Post oak------------	55	---	Sweetgum.
							Sweetgum------------	---	---	
							Water oak-----------	---	---	
Cart---------------	11A	Slight	Slight	Slight	Slight	Slight	Loblolly pine-------	102	462	Loblolly pine.
							Slash pine----------	102	---	
							Shortleaf pine------	87	368	
							Sweetgum------------	100	305	
							Southern red oak----	90	207	
BoC---------------- Bowie	9A	Slight	Slight	Slight	Slight	Slight	Loblolly pine-------	91	340	Loblolly pine, slash pine, shortleaf pine.
							Shortleaf pine------	80	271	
CbE---------------- Cuthbert	8C	Moderate	Moderate	Slight	Slight	Slight	Loblolly pine-------	85	280	Loblolly pine.
							Shortleaf pine------	76	232	
CgE---------------- Cuthbert	8F	Moderate	Moderate	Moderate	Slight	Slight	Loblolly pine-------	85	280	Loblolly pine.
							Shortleaf pine------	76	232	
CgF---------------- Cuthbert	8R	Severe	Severe	Moderate	Slight	Slight	Loblolly pine-------	80	230	Loblolly pine.
							Shortleaf pine------	70	173	
Cy----------------- Cypress	0W	Slight	Severe	Severe	Severe	Severe	Baldcypress---------	---	---	Baldcypress.

See footnotes at end of table.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Management concerns: Plant competition	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Volume*	Trees to plant
DbC: Darbonne	8F	Slight	Slight	Slight	Moderate	Moderate	Loblolly pine	85	280	Loblolly pine.
							Shortleaf pine	75	222	
							Hickory	---	---	
							Southern red oak	---	---	
							White oak	---	---	
							Sweetgum	---	---	
DcC, DcE: Darco	8S	Slight	Moderate	Moderate	Slight	Moderate	Loblolly pine	85	280	Loblolly pine, shortleaf pine.
							Shortleaf pine	68	155	
DrC, DrE: Darden	8S	Slight	Moderate	Severe	Slight	Slight	Loblolly pine	80	230	Loblolly pine, slash pine.
							Shortleaf pine	70	173	
EaC: Eastwood	10C	Slight	Moderate	Slight	Slight	Slight	Loblolly pine	93	360	Loblolly pine.
							Shortleaf pine	---	---	
							Sweetgum	---	---	
							Southern red oak	---	---	
							Hickory	---	---	
EaE: Eastwood	9C	Moderate	Moderate	Slight	Slight	Slight	Loblolly pine	86	290	Loblolly pine.
							Shortleaf pine	77	241	
							Sweetgum	---	---	
							Southern red oak	---	---	
							Hickory	---	---	
EbB: Elrose	10A	Slight	Slight	Slight	Slight	Slight	Loblolly pine	94	370	Loblolly pine, shortleaf pine.
							Shortleaf pine	85	340	
							Sweetgum	90	207	
							Southern red oak	---	---	
EcA**:										
Erno	11A	Slight	Slight	Slight	Slight	Slight	Loblolly pine	100	430	Loblolly pine.
							Shortleaf pine	90	410	
							Sweetgum	100	305	
							Southern red oak	90	207	
Cart	11A	Slight	Slight	Slight	Slight	Slight	Loblolly pine	102	462	Loblolly pine.
							Slash pine	102	---	
							Shortleaf pine	87	368	
							Sweetgum	100	305	
							Southern red oak	90	207	

See footnotes at end of table.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Potential productivity: Common trees	Site index	Volume*	Trees to plant
Es: Estes	8W	Slight	Severe	Moderate	Slight	Moderate	Sweetgum	93	360	Sweetgum, American sycamore, water oak, loblolly pine.
							Willow oak	86	171	
							Water oak	93	236	
							Green ash	---	---	
GcA**:										
Guyton	9W	Slight	Severe	Moderate	Severe	Severe	Loblolly pine	90	330	Loblolly pine, sweetgum, water oak, cherrybark oak.
							Sweetgum	90	207	
							Green ash	---	---	
							Southern red oak	---	---	
							Water oak	---	---	
Cart	11A	Slight	Slight	Slight	Slight	Slight	Loblolly pine	102	462	Loblolly pine.
							Slash pine	102	---	
							Shortleaf pine	87	368	
							Sweetgum	100	305	
							Southern red oak	90	207	
Iu: Iuka	12W	Slight	Moderate	Moderate	Slight	Severe	Loblolly pine	110	590	Loblolly pine, eastern cottonwood.
							Sweetgum	100	305	
							Water oak	100	305	
							Eastern cottonwood	105	---	
KfC: Kirvin	8A	Slight	Slight	Slight	Slight	Slight	Loblolly pine	85	280	Loblolly pine, slash pine.
							Shortleaf pine	75	222	
KgC: Kirvin	8F	Moderate	Moderate	Slight	Slight	Slight	Loblolly pine	85	280	Loblolly pine.
							Shortleaf pine	75	222	
KsC: Kirvin	6C	Moderate	Moderate	Moderate	Slight	Slight	Loblolly pine	70	130	Loblolly pine.
							Shortleaf pine	57	78	
LaA**:										
Latch	10W	Slight	Moderate	Moderate	Slight	Moderate	Loblolly pine	95	380	Loblolly pine, water oak, southern red oak.
							Water oak	---	---	
							Willow oak	---	---	
							Southern red oak	---	---	
							Sweetgum	---	---	
Mollville	8W	Slight	Severe	Moderate	Slight	Severe	Loblolly pine	82	250	Water oak, sweetgum, loblolly pine.
							Water oak	80	120	
							Willow oak	80	120	
							Sweetgum	80	120	

See footnotes at end of table.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Potential productivity: Common trees	Site index	Volume*	Trees to plant
LeB---------------- Latex	10A	Slight	Slight	Slight	Slight	Slight	Loblolly pine------- Shortleaf pine------ Slash pine---------- Sweetgum------------ Southern red oak---- Hickory--------------	96 86 100 95 95 ---	390 354 --- 256 256 ---	Loblolly pine.
LtC---------------- Lilbert	8S	Slight	Slight	Moderate	Slight	Moderate	Loblolly pine------- Shortleaf pine------ Sweetgum------------ Southern red oak----	85 74 --- ---	280 212 --- ---	Loblolly pine, slash pine.
MaG---------------- Maben	8R	Moderate	Moderate	Slight	Slight	Slight	Loblolly pine------- Shortleaf pine------	78 69	210 164	Loblolly pine, shortleaf pine.
MbB, MbC----------- Marklake	7A	Slight	Slight	Slight	Slight	Slight	Loblolly pine------- Sweetgum------------	75 ---	180 ---	Loblolly pine.
MbE---------------- Marklake	6R	Moderate	Moderate	Slight	Slight	Slight	Loblolly pine------- Sweetgum------------	70 ---	130 ---	Loblolly pine.
McA**:										
Metcalf-----------	10W	Slight	Moderate	Slight	--------	--------	Loblolly pine------- Shortleaf pine------ Sweetgum------------	92 74 ---	350 212 ---	Loblolly pine.
Cart--------------	11A	Slight	Slight	Slight	Slight	Slight	Loblolly pine------- Slash pine---------- Shortleaf pine------ Sweetgum------------ Southern red oak----	102 102 87 100 90	462 --- 368 305 207	Loblolly pine.
MeB---------------- Meth	8A	Slight	Slight	Slight	--------	--------	Loblolly pine------- Shortleaf pine------ Sweetgum------------ Southern red oak----	85 76 --- ---	280 232 --- ---	Loblolly pine, slash pine.
Mm**:										
Mooreville--------	10W	Slight	Moderate	Severe	Slight	Moderate	Loblolly pine------- Eastern cottonwood-- Green ash----------- Sweetgum------------	95 105 80 100	380 --- 120 305	Eastern cottonwood, green ash, loblolly pine, sweetgum.

See footnotes at end of table.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Management concerns: Plant competition	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Volume*	Trees to plant
Mm**:										
Mantachie	10W	Slight	Severe	Severe	Slight	Severe	Loblolly pine	98	410	Loblolly pine, eastern cottonwood, green ash, sweetgum.
							Eastern cottonwood	90	---	
							Green ash	80	120	
							Sweetgum	95	256	
Nu Nugent	9S	Slight	Moderate	Moderate	Slight	Slight	Loblolly pine	90	330	Loblolly pine, slash pine, sweetgum, water oak.
							Slash pine	90	---	
							Sweetgum	95	256	
							Water oak	85	262	
							Willow oak	85	262	
PkC, PkE Pickton	8S	Slight	Slight	Moderate	Slight	Moderate	Loblolly pine	85	280	Loblolly pine, slash pine, southern red oak.
							Shortleaf pine	75	222	
							Southern red oak	70	84	
PrB, PrC, PrE Pirkey	8A	Slight	Slight	Slight	Slight	Slight	Loblolly pine	80	230	Loblolly pine.
							Shortleaf pine	72	193	
SaC Sacul	9C	Slight	Moderate	Slight	Moderate	Moderate	Loblolly pine	90	330	Loblolly pine, shortleaf pine.
							Shortleaf pine	80	271	
Sm**:										
Sardis	12W	Slight	Slight	Moderate	Moderate	Severe	Loblolly pine	107	542	Loblolly pine, sweetgum, shortleaf pine, cherrybark oak.
							Sweetgum	110	395	
							Water oak	105	350	
							Cherrybark oak	105	350	
Sm**:										
Mathiston	10W	Slight	Moderate	Severe	Slight	Moderate	Loblolly pine	95	380	Green ash, loblolly pine, sweetgum, American sycamore.
							Green ash	90	207	
							Sweetgum	95	256	
SrA Sawyer	10A	Slight	Slight	Slight	Slight	Moderate	Loblolly pine	94	370	Loblolly pine, slash pine, shortleaf pine.
							Slash pine	90	---	
							Shortleaf pine	83	312	
SvA Scottsville	11W	Slight	Moderate	Slight	Slight	Severe	Loblolly pine	100	430	Loblolly pine.
							Shortleaf pine	86	354	
							Southern red oak	90	207	
							Sweetgum	100	305	
							Water oak	100	305	

See footnotes at end of table.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Management concerns: Plant competition	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Volume*	Trees to plant
Sz----------------- Socagee	7W	Slight	Severe	Moderate	Slight	Severe	Sweetgum------------	90	207	
							Willow oak----------	82	135	
							Water oak-----------	82	135	
							Overcup oak---------	84	150	
WaE---------------- Warnock	9A	Slight	Slight	Slight	Slight	Moderate	Loblolly pine-------	91	340	Loblolly pine.
							Shortleaf pine------	80	271	
WoC, WoE----------- Wolfpen	9S	Slight	Slight	Moderate	Slight	Moderate	Loblolly pine-------	90	330	Loblolly pine, slash pine, shortleaf pine.
							Shortleaf pine------	82	299	

* Volume is the yield in board feet (Doyle rule) per year over a 50-year period for fully stocked natural stands.
** See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 7.--WOODLAND UNDERSTORY VEGETATION

(Only the soils suitable for production of commercial trees are listed)

Soil name and map symbol	Total production: Kind of year	Total production: Dry weight	Characteristic vegetation	Composition
		Lb/acre		Pct
BaB: Bernaldo	Favorable	1,300	Pinehill bluestem	55
	Normal	1,050	Slender bluestem	5
	Unfavorable	800	Longleaf uniola	5
			Splitbeard bluestem	5
			Southern bayberry	5
			Carolina jessamine	5
			Yaupon	5
			American beautyberry	5
Bb: Bibb	Favorable	1,500	Pinehill bluestem	25
	Normal	1,200	Cutover muhly	17
	Unfavorable	900	Longleaf uniola	17
			Grassleaf goldaster	13
			Beaked panicum	7
BeB: Bienville	Favorable	---	Pinehill bluestem	20
	Normal	1,100	Little bluestem	20
	Unfavorable	---	Panicum	20
			Longleaf uniola	10
			Threeawn	10
BnA*. Bonn-Cart				
BoC: Bowie	Favorable	3,500	Pinehill bluestem	50
	Normal	3,000	Pineywoods dropseed	10
	Unfavorable	2,000	Longleaf uniola	10
			Big bluestem	10
			Indiangrass	5
CbE, CgE: Cuthbert	Favorable	2,300	Pinehill bluestem	50
	Normal	1,800	Big bluestem	10
	Unfavorable	1,300	Longleaf uniola	10
			Fineleaf bluestem	5
			Pineywoods dropseed	5
			Cutover muhly	5
CgF: Cuthbert	Favorable	2,200	Pinehill bluestem	50
	Normal	1,700	Longleaf uniola	10
	Unfavorable	1,200	Fineleaf bluestem	10
			Big bluestem	5
			Pineywoods dropseed	5
Cy: Cypress	Favorable	---	Common buttonbush	15
	Normal	---	Smartweed	10
	Unfavorable	---	Waterleaf	10
			Marsh St johnswort	10
			Water elm	30
			False nettle	20
			Yellow waterlily	5
DbC. Darbonne				

See footnote at end of table.

TABLE 7.--WOODLAND UNDERSTORY VEGETATION--Continued

Soil name and map symbol	Total production: Kind of year	Total production: Dry weight	Characteristic vegetation	Composition
		Lb/acre		Pct
DcC, DcE-----------	Favorable	1,650	Pinehill bluestem-------------------------	50
Darco	Normal	1,350	Longleaf uniola---------------------------	10
	Unfavorable	1,000	Indiangrass-------------------------------	5
			Fineleaf bluestem-------------------------	5
			Splitbeard bluestem-----------------------	5
			Pineywoods dropseed-----------------------	5
			Purple lovegrass--------------------------	5
			Fringeleaf paspalum-----------------------	5
DrC, DrE-----------	Favorable	3,000	Broomsedge bluestem-----------------------	20
Darden	Normal	2,000	Pinehill bluestem-------------------------	15
	Unfavorable	1,200	Little bluestem---------------------------	10
			Purpletop---------------------------------	10
			Panicum-----------------------------------	10
			Indiangrass-------------------------------	5
			Arrowfeather threeawn---------------------	5
			Bluejack oak------------------------------	5
			Blackjack oak-----------------------------	5
			Post oak----------------------------------	5
EaC, EaE-----------	Favorable	2,500	Pinehill bluestem-------------------------	15
Eastwood	Normal	2,000	Longleaf uniola---------------------------	10
	Unfavorable	1,500	Panicum-----------------------------------	5
			Purpletop---------------------------------	5
			Hawthorn----------------------------------	5
			Greenbrier--------------------------------	5
			Southern red oak--------------------------	5
EbB----------------	Favorable	1,500	Longleaf uniola---------------------------	10
Elrose	Normal	1,200	Pineywoods dropseed-----------------------	10
	Unfavorable	900	Big bluestem------------------------------	10
			Pinehill bluestem-------------------------	10
EcA*:				
Erno---------------	Favorable	3,000	Pinehill bluestem-------------------------	15
	Normal	2,000	Beaked panicum----------------------------	15
	Unfavorable	1,500	Longleaf uniola---------------------------	10
			Panicum-----------------------------------	10
			Indiangrass-------------------------------	5
			Purpletop---------------------------------	5
Cart---------------	Favorable	2,600	Pinehill bluestem-------------------------	15
	Normal	2,200	Beaked panicum----------------------------	15
	Unfavorable	1,700	Longleaf uniola---------------------------	10
			Panicum-----------------------------------	10
			Indiangrass-------------------------------	5
			Purpletop---------------------------------	5
Es-----------------	Favorable	1,900	Longleaf uniola---------------------------	15
Estes	Normal	1,700	Pinehill bluestem-------------------------	15
	Unfavorable	1,500	Sedge-------------------------------------	10
			Beaked panicum----------------------------	10
			Panicum-----------------------------------	5
			Greenbrier--------------------------------	5
			Alabama supplejack------------------------	5
GcA*:				
Guyton-------------	Favorable	---	Pinehill bluestem-------------------------	50
	Normal	1,800	Chalky bluestem---------------------------	15
	Unfavorable	---	Silver plumegrass-------------------------	15

See footnote at end of table.

TABLE 7.--WOODLAND UNDERSTORY VEGETATION--Continued

Soil name and map symbol	Total production: Kind of year	Total production: Dry weight	Characteristic vegetation	Composition
		Lb/acre		Pct
GcA*:				
Cart	Favorable	2,600	Pinehill bluestem	15
	Normal	2,200	Beaked panicum	15
	Unfavorable	1,700	Longleaf uniola	10
			Panicum	10
			Indiangrass	5
			Purpletop	5
Iu	Favorable	1,800	Pinehill bluestem	50
Iuka	Normal	1,500	Beaked panicum	10
	Unfavorable	1,200	Spreading panicum	10
			Brownseed paspalum	10
			Longleaf uniola	10
KfC	Favorable	2,000	Pinehill bluestem	50
Kirvin	Normal	1,300	Longleaf uniola	10
	Unfavorable	1,000	Pineywoods dropseed	5
			American beautyberry	5
			Purpletop	5
			Indiangrass	5
			Brownseed paspalum	5
KgC	Favorable	2,400	Pinehill bluestem	50
Kirvin	Normal	1,900	Longleaf uniola	10
	Unfavorable	1,500	American beautyberry	5
			Indiangrass	5
			Brownseed paspalum	5
			Fineleaf bluestem	5
KsC	Favorable	2,300	Pinehill bluestem	50
Kirvin	Normal	1,800	Fineleaf bluestem	10
	Unfavorable	1,200	Longleaf uniola	10
			Big bluestem	10
			Splitbeard bluestem	5
LaA*:				
Latch	Favorable	1,800	Little bluestem	25
	Normal	1,500	Pinehill bluestem	25
	Unfavorable	1,000	Brownseed paspalum	10
			Longleaf uniola	10
			Beaked panicum	10
			Greenbrier	5
			Spreading panicum	5
			Southern bayberry	5
Mollville	Favorable	2,000	Pinehill bluestem	35
	Normal	1,750	Switchgrass	10
	Unfavorable	1,400	Longleaf uniola	10
			Cutover muhly	10
			Switchcane	5
			Beaked panicum	5
			Blackgum	5
			Spreading panicum	5
LeB	Favorable	3,000	Pinehill bluestem	20
Latex	Normal	2,500	Longleaf uniola	15
	Unfavorable	1,800	Beaked panicum	10
			Pineywoods dropseed	5
			Fringeleaf paspalum	5
			Winged elm	5
			Sedge	5

See footnote at end of table.

TABLE 7.--WOODLAND UNDERSTORY VEGETATION--Continued

Soil name and map symbol	Total production: Kind of year	Total production: Dry weight	Characteristic vegetation	Composition
		Lb/acre		Pct
LtC: Lilbert	Favorable	1,500	Pinehill bluestem	50
	Normal	1,200	Fineleaf bluestem	10
	Unfavorable	900	Longleaf uniola	10
			Pineywoods dropseed	10
			Indiangrass	5
MaG: Maben	Favorable	---	Pinehill bluestem	25
	Normal	1,200	Cutover muhly	17
	Unfavorable	---	Longleaf uniola	17
			Beaked panicum	9
MbB, MbC, MbE: Marklake	Favorable	2,400	Pinehill bluestem	25
	Normal	1,800	Broomsedge bluestem	20
	Unfavorable	1,200	Little bluestem	10
			Panicum	10
			Purpletop	5
			Dropseed	5
			Sedge	5
McA*. Metcalf-Cart				
MeB: Meth	Favorable	---	Longleaf uniola	28
	Normal	1,400	Beaked panicum	18
	Unfavorable	---	Panicum	14
			Pinehill bluestem	11
			Little bluestem	11
			Rough tridens	7
Mm*:				
Mooreville	Favorable	---		
	Normal	---		
	Unfavorable	---		
Mantachie	Favorable	---	Longleaf uniola	35
	Normal	2,000	Pinehill bluestem	20
	Unfavorable	---		
Nu: Nugent	Favorable	---	Pinehill bluestem	30
	Normal	1,000	Longleaf uniola	30
	Unfavorable	---	Beaked panicum	15
			Panicum	10
			Slender bluestem	5
			Grassleaf goldaster	5
PkC, PkE: Pickton	Favorable	3,000	Little bluestem	20
	Normal	2,500	Panicum	15
	Unfavorable	2,000	Purpletop	10
			Big bluestem	10
			Indiangrass	5
			Longleaf uniola	5
			Beaked panicum	5
PrB, PrC, PrE. Pirkey				

See footnote at end of table.

TABLE 7.--WOODLAND UNDERSTORY VEGETATION--Continued

Soil name and map symbol	Total production: Kind of year	Total production: Dry weight	Characteristic vegetation	Composition
		Lb/acre		Pct
SaC: Sacul	Favorable	3,000	Bluestem	25
	Normal	2,200	Beaked panicum	15
	Unfavorable	1,500	Uniola	10
			Plumegrass	8
			Panicum	7
			Sedge	5
Sm*:				
Sardis	Favorable	3,000	Switchgrass	20
	Normal	2,500	Plumegrass	20
	Unfavorable	1,800	Beaked panicum	15
			Velvet panicum	10
			Eastern gamagrass	5
			Panicum	5
			Sedge	5
Mathiston	Favorable	---	Pinehill bluestem	28
	Normal	1,800	Switchcane	26
	Unfavorable	---	Longleaf uniola	17
SrA: Sawyer	Favorable	3,000	Uniola	38
	Normal	2,200	Little bluestem	20
	Unfavorable	1,000	Big bluestem	7
			Beaked panicum	5
			Plumegrass	5
			Panicum	5
			Sedge	5
			Farkleberry	5
SvA: Scottsville	Favorable	2,600	Pinehill bluestem	15
	Normal	2,200	Longleaf uniola	10
	Unfavorable	1,700	Panicum	10
			Beaked panicum	5
			Purpletop	5
			Greenbrier	5
			Southern bayberry	5
			Hawthorn	5
			Sedge	5
Sz: Socagee	Favorable	1,600	Sedge	15
	Normal	1,200	Longleaf uniola	10
	Unfavorable	1,000	Panicum	5
			Beaked panicum	5
			Greenbrier	5
			Poison ivy	5
			Yaupon	5
			Cedar elm	5
			Southern bayberry	5
WaE: Warnock	Favorable	3,500	Little bluestem	30
	Normal	3,000	Big bluestem	20
	Unfavorable	2,500	Pineywoods dropseed	10
			Longleaf uniola	10
			Indiangrass	5
WoC, WoE: Wolfpen	Favorable	3,500	Little bluestem	20
	Normal	2,500	Purpletop	15
	Unfavorable	2,000	Panicum	15
			Longleaf uniola	10
			Beaked panicum	10
			Indiangrass	5

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 8.--SELECTED LAWN AND ORNAMENTAL PLANTINGS

Map Symbol	Perennials	Flowers and ground cover	Ornamental grasses	Lawn grasses
BaB, BoC, DbC, EbB, EcA, LeB, MbB, MbC, PrB, PrC	Yarrow, garlic, chives, columbines, southernwood, butterfly weed, aster, shrimp plant, garden canna, Shasta daisy, garden mums, coreopsis, comfrey, Mexican oleander, dianthus, purple coneflower, perennial ageratum, Indian blanket, daisy, gladiolus, Maximilian sunflower, daylilies, spring starflower, bearded iris, Dutch iris, other irises, trailing lantana, red spiderlily, peppermint, daffodils, narcissus, oxalis, rock rose, wild foxglove, perennial phlox, obedient-plant, plumbago, rosemary, mealycup sage, autumn sage, mint, common thyme, verbena, sweet violet, white rainlily, pink rainlily, wild petunia, daisy fleabane, fragrant lily, other lilies, horsemint.	Carpet bugle, turflily, Asian jasmine, lantana, strawberry, wintercreeper, rosemary, hardy fern, lavender cotton, Hall honeysuckle, stonecrop, sargent juniper, shore juniper, dwarf juniper, other junipers, purple Japanese honeysuckle, daylilies, vinca, bearded iris, hydrangea, daffodils, narcissus, jonquil, dwarf crapemyrtle, santolina.	Pampasgrass, blue fescue, giant reed, fountaingrass, eulalia grass, zebra grass, bamboo, dwarf bamboo, buffalograss, curlymesquite grass, indiangrass, sideoats grama, big bluestem, sand bluestem, Texas bluegrass, pappasgrass, little bluestem.	Common bermudagrass, zoysia grass, St. augustine-grass, carpetgrass, hybrid bermudagrass, tall fescue, ryegrass (winter cover only).
Bb, Es, Iu, Mm, Nu, Sm, Sz	Columbine, canna, shrimp plant, garden mums, perennial ageratum, bearded iris, other irises, oxalis, common thyme, red spiderlily, sweet violet, white rainlily, fragrant lily, other lilies.	Carpet bugle, strawberry, hardy fern, vinca minor, aspidistra, hoya, ajuga, dichondra, English ivy.	Giant reed, fountaingrass, zebra grass, bamboo, dwarf bamboo.	Common bermuda-grass, tall fescue, ryegrass (winter cover only).
BeB, LaA, LtC, WaE, WoC, WoE	Yarrow, garlic, chives, columbines, southernwood, butterfly weed, aster, shrimp plant, garden canna, Shasta daisy, other daisies, garden mums, coreopsis, Mexican oleander, dianthus, purple coneflower, perennial ageratum, Indian blanket, gladiolus, Maximilian sunflower, daylilies, lilies, spring starflower.	Carpet bugle, turflily, Asian jasmine, lantana, strawberry, Lady Banksia rose, wintercreeper, dwarf rosemary, hardy fern, lavender cotton, Hall honeysuckle, daylilies, vinca, bearded iris, hydrangea, daffodils, narcissus, jonquil, dwarf crapemyrtle, dwarf juniper, other junipers, santolina.	Pampasgrass, blue fescue, giant reed, fountaingrass, eulalia grass, zebra grass, bamboo, dwarf bamboo, buffalograss, curlymesquite grass, indiangrass, sideoats grama, big bluestem, sand bluestem, Texas bluegrass, pappasgrass, litte bluestem.	Common bermudagrass, zoysia grass, St. augustine-grass, centipedegrass, carpetgrass, hybrid bermuda-grass, tall fescue, ryegrass (winter cover only.)

TABLE 8.--SELECTED LAWN AND ORNAMENTAL PLANTINGS--Continued

Map Symbol	Perennials	Flowers and ground cover	Ornamental grasses	Lawn grasses
BnA	Columbine, shrimp plant, hardy ferns, garden canna, dianthus, perennial ageratum, daylilies, iris, red spiderlily, peppermint, oxalis, common thyme, sweet violet, white rainlily, pink rainlily, other lilies, horsemint.	Turflily, lantana, wintercreeper, daylily, ajuga, Hall honeysuckle, ornamental strawberry, Asian jasmine, purple Japanese honeysuckle, daylilies, vinca major, hydrangea, hardy fern.	Giant reed, fountaingrass, zebra grass, bamboo, dwarf bamboo.	Common bermudagrass, zoysia grass, St. augustinegrass, tall fescue, ryegrass (winter cover only).
CbE, CgE, CgF, EaC, EaE, KfC, KgC, KsC, MeB, SaC	Yarrow, garlic, chives, southernwood, butterfly weed, aster, Shasta daisy, other daisies, coreopsis, purple coneflower, Indian blanket, Maximilian sunflower, daylilies, bearded iris, Dutch iris, trailing lantana, rock rose, wild foxglove, perennial phlox, rosemary, mealycup sage, autumn sage, comfrey, mint, common thyme, verbena, wild petunia, daisy fleabane, horsemint.	Turflily, lantana, wintercreeper, dwarf rosemary, lavender cotton, Hall honeysuckle, sargent juniper, shore juniper, dwarf juniper, other junipers, purple Japanese honeysuckle, daylilies, vinca, bearded iris, daffodils, narcissus, hydrangea, jonquil.	Pampasgrass, blue fescue, giant reed, fountaingrass, eulalia grass, zebra grass, bamboo, dwarf bamboo, indiangrass, sideoats grama.	Common bermudagrass, zoysia grass, St. augustinegrass, centipedegrass, carpetgrass, hybrid bermuda-grass, tall fescue, ryegrass (winter cover only).
DcC, DcE, DrC, DrE, PkC, PkE	Yarrow, garlic, chives, butterfly weed, Shasta daisy, coreopsis, Mexican oleander, Indian blanket, Maximilian sunflower, bearded iris, lantana, wild foxglove, plumbago, rosemary, mealycup sage, autumn sage, mint, wild petunia, perennial phlox, daisy fleabane, horsemint, liatris.	Lantana, wintercreeper, sargent juniper, shore juniper, dwarf juniper, other junipers, santolina.	Pampasgrass, blue grama, buffalograss, curlymesquite grass, indiangrass, sideoats grama, big bluestem, sand bluestem, Texas bluegrass, pappasgrass, little bluestem.	Common bermudagrass, zoysia grass.
GcA	Columbine, shrimp plant, canna, perennial ageratum, lilies, bearded iris, other irises, red spiderlily, peppermint, oxalis, perennial phlox, common thyme, sweet violet, white rainlily, pink rainlily.	Strawberry, hardy fern, hoya, ajuga, dichondra.	Giant reed, fountaingrass, eulalia grass, zebra grass, bamboo, dwarf bamboo.	Common bermudagrass, zoysia grass, St. augustinegrass, tall fescue, ryegrass (winter cover only).
McA, SrA, SvA	Yarrow, dianthus, daylilies, bearded iris, Dutch iris, other irises, perennial phlox, rosemary, mint, common thyme, wild petunia, larkspur, horsemint.	Turflily, lantana, wintercreeper, dwarf rosemary, lavender cotton, Hall honeysuckle, sargent juniper, shore juniper, other junipers, purple Japanese honeysuckle, daylilies, vinca, hydrangea, hardy fern.	Pampasgrass, blue fescue, giant reed, fountaingrass, eulalia grass, zebra grass, bamboo, dwarf bamboo, indiangrass, sideoats grama.	Common bermudagrass, zoysia grass, St. augustinegrass, tall fescue, ryegrass (winter cover only).

TABLE 9.--SELECTED NUT- AND FRUIT-BEARING PLANTINGS

Map symbol	Nut-bearing trees	Fruit-bearing trees	Fruit-bearing shrubs	Fruit-bearing vines
BaB, BoC, DbC, EbB, EcA, LeB, MbB, MbC, PrB, PrC	Pecan, walnut, hickory, pistachio, chestnuts (blight-resistant hybrids).	Chokecherry, mayhaw, elderberry, apples, crabapples, peaches, plums, apricots, nectarines, figs, pears, persimmons, Japanese persimmon, pawpaw, jujube, fruiting mulberry, sour cherry (Montmorency).	Quince, rabbiteye blueberries, low-chill highbush blueberries, pomegranate, feijoa (pineapple guava), Nanking cherries.	Passion vine (maypop), blackberries, raspberries, strawberries, muscadine, American grapes (Pierce's disease resistant), hybrid grapes (Pierce's disease resistant).
Bb, Es, Iu, Mn, Nu, Sm, Sz	Pecan, hickory	Chokecherry, mayhaw, elderberry, farkleberry, native blueberry, pawpaw.	Quince	Passion vine (maypop), dewberries (native).
BeB, LaA, LtC, WaE, WoC, WoE	Pecan, walnut, hickory, pistachio, chestnuts (blight-resistant hybrids).	Chokecherry, mayhaw, elderberry, apples, crabapples, peaches, plums, apricots, nectarines, figs, pears, persimmon, Japanese persimmon.	Quince, rabbiteye blueberries, low-chill highbush blueberries, pomegranate, feijoa (pineapple guava) Nanking cherries.	Passion vine (maypop), blackberries, raspberries, strawberries, muscadine, American grapes (Pierce's disease resistant), hybrid grapes (Pierce's disease resistant).
BnA	---	Jujube, fruiting mulberry	Quince, pomegranate, feijoa, Nanking cherries.	Passion vine (maypop), blackberries, strawberries.
CbE, CgE, CgF, EaC, EaE, KfC, KgC, KsC, MeB, SaC	Pecan, walnut, hickory, pistachio, chestnuts (blight-resistant hybrids).	Chokecherry, mayhaw, elderberry, apples, crabapples, peaches, plums, apricots, nectarines, figs, pears, persimmon, Japanese persimmon, pawpaw, jujube, fruiting mulbrerry, sour cherry (Montmorency).	Quince, rabbiteye blueberries, low-chill highbush blueberries, pomegranate, feijoa (pineapple guava), Nanking cherries.	Passion vine (maypop), blackberries, raspberries, strawberries, muscadine, American grapes (Pierce's disease resistant), hybrid grapes (Pierce's disease resistant).
DcC, DcE, DrC, DrE, PkC, PkE	Hickory	Figs, persimmon, Japanese persimmon, fruiting mulberry, jujube.	Pomegranate, quince, Nanking cherries.	Muscadine, American grapes (Pierce's disease resistant), Hybrid grapes (Pierce's disease resistant).

TABLE 9.--SELECTED NUT- AND FRUIT-BEARING PLANTINGS--Continued

Map symbol	Nut-bearing trees	Fruit-bearing trees	Fruit-bearing shrubs	Fruit-bearing vines
GcA	---	Chokecherry, elderberry, mayhaw, pawpaw-	Quince, feijoa, Nanking cherries.	Passion vine (maypop), dewberries (native).
McA, SrA, SvA	Pecan, walnut, hickory, pistachio, chestnuts (blight-resistant hybrids).	Chokecherry, mayhaw, elderberry, peaches, plums, apricots, pears, Japanese persimmon, pawpaw, jujube, sour cherry (Montmorency), apples, crabapples.	Quince, pomegranate, Nanking cherries, rabbiteye blueberries, low-chill highbush blueberries.	Passion vine (maypop), blackberries, raspberries, strawberries, muscadine, American grapes (Pierce's disease resistant), hybrid grapes (Pierce's disease resistant).

TABLE 10.--SELECTED VINES, SHRUBS, AND TREE PLANTINGS

Map symbol	Vines	Shrubs	Trees
BaB, BoC, DbC, EbB, EcA, LeB, MbB, MbC, PrB, PrC	Coralvine, catclaw, climbing fig, Lady Banksia rose, Japanese star jasmine, confederate jasmine, wisteria, English ivy, crossvine, trumpet-creeper, clematis, Algerian ivy, Virginia creeper, passion flower, silver-lace vine, smilax, muscadine, fox grape, winegrape, hyacinth bean, cypress vine, potato vine, morningglory, Japanese honeysuckle, coral honeysuckle, bush grape, canyon grape, post-oak grape, balsam apple.	Dwarf abelia, barberry, false heather, dwarf gardenia, red yucca, dwarf Chinese holly, dwarf yaupon holly, nandina, sage, bamboo, boxwood, Oregongrape, pyracantha, spirea, viburnum, camellia, wahoo, azaleas, althea, cenizo, ligustrum, pittosporum, red tip photinia, sumac, lilac, vitex, sweet olive, Indian hawthorn, dwarf pomegranate, dwarf yucca, Japanese black pine, Indian azalea, elaeagnum, flowering pomegranate, gardenia, cape jasmine, Japanese quince, Pfitzer juniper, other junipers, primrose jasmine, oleander, crapemyrtle, sasanqua, bridal wreath, spirea, baby-breath, viburnum, dwarf wax-myrtle, French mulberry, forsythia, oakleaf hydrangea, spicebush, bottlebrush.	SMALL: Loquat, possumhaw holly, American holly, yaupon holly, other hollies, red cedar, junipers, crapemyrtle, glossy privet, Frazer photinia, other photinias, yew, cherry laurel, arborvitae, dogwood, river birch, Bradford flowering pear, aristocrat flowering pear, other pears, flowering peach, redbud, crabapple, Manzinilla olive, Mexican plum, fringetree, hawthorn, mayhaw, southern golden raintree, Japanese crapemyrtle, dwarf crapemyrtle, dwarf magnolia, magnolia, Caroline buckthorn, Chinese date, red buckeye, Japanese red maple, purple-leaved plum, vitex, red huckleberry, Japanese black pine, silverbell, black haw, pawpaw, sourwood. LARGE AND MEDIUM: Beech, hickory, walnut, river birch, pecan, Deodar cedar, atlas cedar, hackberry, araqua, Chinese parasol, ginkgo, sweetgum, tulip poplar, southern magnolia, slash pine, aleppo pine, loblolly pine, Chinese pistachio, sycamore, live oak, bur oak, water oak, southern red oak, Shumard oak, Texas oak, willow oak, pin oak, soapberry, Chinese tallow, baldcypress, cedar elm, Chinese elm, red cedar, Arizona cypress, Texas persimmon, wax-myrtle, sassafras, black locust, silver maple, fruitless mulberry, red maple, southern sweetbay, willow oak, shortleaf pine, winged elm, Texas ash, Arizona ash, American linden. CHRISTMAS TREES: Virginia pine.
Bb, Iu, Es, Mn, Nu, Sm, Sz	Climbing fig, Japanese star jasmine, English ivy, passion flower, hyacinth bean, cypress vine, morningglory.	Dwarf gardenia, dwarf Chinese holly, other hollies, bamboo, cleyera, Oregongrape, camellia, wahoo, azaleas, aspidistra, gardenia, sasanqua, bottlebrush.	SMALL: Possumhaw holly, American holly, yaupon holly, wax-myrtle, chokecherry, huckleberry, farkleberry, wild blueberry, mayhaw, elderberry, pawpaw, hawthorn. LARGE AND MEDIUM: Beech, river birch, cottonwood, willow, baldcypress, overcup oak, water oak, willow oak, sweetgum, sassafras, pecan, hickory, southern magnolia, sweetgum.

TABLE 10.--SELECTED VINES, SHRUBS, AND TREE PLANTINGS--Continued

Map symbol	Vines	Shrubs	Trees
BeB, LaA, LtC, WaE, WoC, WoE	Coralvine, catclaw, Lady Banksia rose, wisteria, crossvine, trumpet-creeper, clematis, Virginia creeper, passion flower, silver-lace vine, smilax, muscadine, fox grape, snailseed vine, hyacinth bean, cypress vine, potato vine, morningglory, Japanese honey-suckle, coral honeysuckle, bush grape, canyon grape, post-oak grape, balsam apple.	Dwarf abelia, barberry, cotoneaster, false heather, dwarf gardenia, red yucca, dwarf Chinese holly, dwarf burford holly, dwarf yaupon holly, nandina, sage, bamboo, boxwood, quince, cleyera, Oregongrape, pyracantha, spirea, viburnum, camellia, wahoo, azaleas, althea, cenizo, ligustrum, pittosporum, red tip photinia, sumac, lilac, vitex, sweet olive, Indian hawthorn, dwarf pomegranate, aspidistra, dwarf yucca, Japanese black pine, Indian azalea, elaegnus, flowering pomegranate, gardenia, cape jasmine, Japanese quince, Pfitzer juniper, other junipers, primrose jasmine, oleander, crapemyrtle, sasanqua, bridal wreath, spirea, baby-breath, viburnum, dwarf wax-myrtle, French mulberry, forsythia, sweet olive, oakleaf hydrangea, spicebush, bottlebrush.	SMALL: Loquat, possumhaw holly, American holly, yaupon holly, other hollies, red cedar, junipers, photinia, yew, cherry laurel, arborvitae, dogwood, river birch, Bradford flowering pear, aristocrat pear, flowering pear, other pears, flowering peach, redbud, crabapple, Manzinilla olive, Mexican plum, fringetree, hawthorn, mayhaw, southern golden raintree, Japanese crapemyrtle, dwarf magnolia, magnolia, Carolina buckthorn, Chinese date, red buckeye, Japanese red maple, purple-leaved plum, vitex, tree huckleberry, silverbell, black haw, pawpaw, sourwood, Japanese black pine. LARGE AND MEDIUM: Deodar cedar, pecan, atlas cedar, hackberry, Chinese parasol, ginkgo, aleppo pine, Chinese pistachio, sycamore, live oak, Shumard red oak, soapberry, Chinese tallow, Chinese elm, red cedar, Arizona cypress, baldcypress, wax-myrtle, fruitless mulberry, silver maple, Texas ash, Arizona ash, winged elm.
BnA-------	Coralvine, crossvine, trumpet-creeper, Virginia creeper, English ivy, Boston ivy, clematis, morning-glory, cypress vine, Algerian ivy, confederate jasmine, smilax, passion flower, hyacinth bean.	Dwarf abelia, dwarf burford holly, dwarf Chinese holly, dwarf yaupon holly, other hollies, dwarf Indian hawthorn, Oregongrape, dwarf wax-myrtle, bottlebrush, dwarf bamboo, dwarf nandina, elaeagnus, bridal wreath, spirea, baby-breath, dwarf wax-myrtle, French mulberry, lilac.	SMALL: Loquat, glossy privet, possumhaw holly, yaupon holly, river birch, Mexican plum, wax-myrtle, photinia, yew, vitex, Carolina buckthorn. LARGE AND MEDIUM: Post oak, bumelia, bur oak, live oak, Afghan pine, western soapberry, ailanthus (tree of heaven), ginkgo, baldcypress, fruitless mulberry.

TABLE 10.--SELECTED VINES, SHRUBS, AND TREE PLANTINGS--Continued

Map symbol	Vines	Shrubs	Trees
CbE, CgE, CgF, EaC, EaE, KfC, KgC, KsC, MeB, SaC-	Coralvine, catclaw, climbing fig, Lady Banksia rose, Japanese star jasmine, confederate jasmine, wisteria, crossvine, trumpet-creeper, clematis, Virginia creeper, smilax, fox grape, muscadine, wine grape, hyacinth bean, morning-glory, Japanese honeysuckle, coral honeysuckle, bush grape, canyon grape, post-oak grape, balsam apple.	Dwarf abelia, barberry, false heather, dwarf gardenia, dwarf Chinese holly, dwarf burford holly, dwarf yaupon holly, sage, nandina, bamboo, boxwood, quince, Oregongrape, pyracantha, spirea, wahoo, viburnum, camellia, azaleas, althea, cenizo, ligustrum, pittosporum, dwarf red tip photinia, sumac, lilac, sweet olive, Indian hawthorn, dwarf yucca, dwarf pomegranate, aspidistra, Japanese black pine, Indian azalea, elaeagnus, flowering pomegranate, gardenia, cape jasmine, Japanese quince, Pfitzer juniper, other junipers, primrose jasmine, oleander, crapemyrtle, sasanqua, bridal wreath, spirea, baby-breath, dwarf wax-myrtle, French mulberry, forsythia, cotoneaster, oakleaf hydrangea, spicebush, bottlebrush.	SMALL: Loquat, possumhaw holly, American holly, other hollies, red cedar, junipers, crapemyrtle, glossy privet, Frazer photinia, other photinias, yew, cherry laurel, arborvitae, dogwood, Bradford flowering pear, aristocrat flowering pear, other pears, flowering peach, redbud, crabapple, Mexican plum, Manzinilla olive, fringetree, hawthorn, mayhaw, southern golden raintree, Japanese crapemyrtle, dwarf magnolia, magnolia, Carolina buckthorn, purple-leaved plum, vitex, tree huckleberry, silverbell black haw, pawpaw, sourwood, Chinese date, red buckeye, Japanese red maple, Japanese black pine. LARGE AND MEDIUM: Beech, post oak, hickory, walnut, river birch, Deodar cedar, atlas cedar, hackberry, anaqua, Chinese parasol, ginkgo, sweetgum, tulip poplar, southern magnolia, slash pine, aleppo pine, loblolly pine, Chinese pistachio, sycamore, live oak, bur oak, water oak, Shumard oak, southern red oak, Texas oak, willow oak, pin oak, soapberry, Chinese tallow, baldcypress, cedar elm, Chinese elm, red cedar, Arizona cypress, Texas persimmon, wax-myrtle, sassafras, black locust, silver maple, fruitless mulberry, red maple, southern sweetbay, shortleaf pine, winged elm, Arizona ash, Texas ash, American linden. CHRISTMAS TREES: Virginia pine.
DcC, DcE, DrC, DrE, PkC, PkE-	Coralvine, catclaw, Lady Banksia rose, wisteria, crossvine, trumpet-creeper, smilax muscadine, fox grape, wine grape, Japanese honey-suckle, bush grape, canyon grape, post-oak grape.	Barberry, rock cotoneaster, red yucca, dwarf Chinese holly, dwarf burford holly, dwarf yaupon holly, nandina, althea, boxwood, pyracantha, cenizo, red tip photinia, vitex, dwarf pomegranate, dwarf yucca, Japanese black pine, elaeagnus, flowering pomegranate, Pfitzer juniper, other junipers, French mulberry, forsythia, cotoneaster, lilac.	SMALL: Possumhaw holly, yaupon holly, other hollies, glossy privet, yew, red cedar, junipers, arborvitae, redbud, Mexican plum, southern golden raintree, Carolina buckthorn, Chinese date, vitex, Japanese black pine. LARGE AND MEDIUM: Deodar cedar, post oak, bur oak, atlas cedar, hackberry, slash pine, aleppo pine, sycamore, live oak, southern red oak, Shumard oak, western soapberry, cedar elm, Chinese elm, red cedar, Arizona cypress, Texas persimmon, fruitless mulberry, winged elm, Texas ash, Arizona ash.

TABLE 10.--SELECTED VINES, SHRUBS, AND TREE PLANTINGS--Continued

Map symbol	Vines	Shrubs	Trees
GcA	Climbing fig, Japanese star jasmine, hyacinth bean, morning-glory.	Bamboo, cleyera, holly, wahoo, bottlebrush, willow, dwarf wax-myrtle, Oregongrape.	SMALL: Possumhaw holly, yaupon holly, wax-myrtle, redbud, purple-leaved plum. LARGE AND MEDIUM: Post oak, elm, sycamore, baldcypress, water oak, bur oak, Shumard red oak, live oak, western soapberry, cottonwood, hackberry, Texas ash.
McA, SrA, SvA	Coralvine, wisteria, crossvine, trumpet-creeper, clematis, morningglory.	Dwarf abelia, dwarf gardenia, dwarf burford holly, dwarf yaupon holly, bamboo, aucuba, cleyera, Oregongrape, camellia, wahoo, azaleas, lilac, Indian hawthorn, Indian azalea, gardenia, cape jasmine, sasanqua, viburnum, dwarf wax-myrtle, oakleaf hydrangea, spicebush, bottlebrush.	SMALL: Holly, possumhaw holly, glossy privet, yew, cherry laurel, dogwood, hawthorn, mayhaw, dwarf magnolia, magnolia, tree huckleberry, black haw, pawpaw, Japanese red maple. LARGE AND MEDIUM: Beech, pecan, river birch, hackberry, sweetgum, southern magnolia, willow, Chinese pistachio, live oak, pin oak, water pad, willow oak, baldcypress, wax-myrtle, sassafras, silver maple, red maple, southern sweetbay, American linden. CHRISTMAS TREES: Virginia pine.

TABLE 11.--RECREATIONAL DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the "Glossary." See text for definitions of "slight," "moderate," and "severe")

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
BaB: Bernaldo	Slight	Slight	Moderate: slope.	Slight.
Bb: Bibb	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding, too sandy.	Severe: wetness.
BeB: Bienville	Moderate: too sandy.	Moderate: too sandy.	Moderate: slope, too sandy.	Moderate: too sandy.
BnA*:				
Bonn	Severe: flooding, wetness, percs slowly.	Severe: wetness, excess sodium, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness.
Cart	Slight	Slight	Slight	Slight.
BoC: Bowie	Slight	Slight	Moderate: slope.	Slight.
CbE: Cuthbert	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Severe: erodes easily.
CgE: Cuthbert	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope, small stones.	Slight.
CgF: Cuthbert	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe.
Cy: Cypress	Severe: flooding, ponding, percs slowly.	Severe: ponding, percs slowly.	Severe: excess humus, ponding, percs slowly.	Severe: ponding.
DbC: Darbonne	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight.
DcC: Darco	Moderate: too sandy.	Moderate: too sandy.	Moderate: too sandy, slope.	Moderate: too sandy.
DcE: Darco	Moderate: too sandy, slope.	Moderate: too sandy, slope.	Severe: slope.	Moderate: too sandy.
DrC: Darden	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.
DrE: Darden	Severe: too sandy.	Severe: too sandy.	Severe: slope, too sandy.	Severe: too sandy.

See footnote at end of table.

TABLE 11.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
EaC: Eastwood	Severe: percs slowly.	Severe: percs slowly.	Severe: percs slowly.	Severe: erodes easily.
EaE: Eastwood	Severe: percs slowly.	Severe: percs slowly.	Severe: slope, percs slowly.	Severe: erodes easily.
EbB: Elrose	Slight	Slight	Moderate: slope, small stones.	Slight.
EcA*:				
Erno	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: percs slowly.	Slight.
Cart	Slight	Slight	Slight	Slight.
Es: Estes	Severe: flooding, ponding, percs slowly.	Severe: ponding, too clayey, percs slowly.	Severe: too clayey, ponding.	Severe: ponding, too clayey.
GcA*:				
Guyton	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Cart	Slight	Slight	Slight	Slight.
Iu: Iuka	Severe: flooding, wetness.	Moderate: flooding, wetness.	Severe: wetness, flooding.	Moderate: wetness, flooding.
KfC: Kirvin	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope.	Slight.
KgC: Kirvin	Severe: small stones.	Severe: small stones.	Severe: small stones.	Slight.
KsC: Kirvin	Moderate: small stones, percs slowly.	Moderate: small stones, percs slowly.	Severe: small stones.	Slight.
LaA*:				
Latch	Moderate: too sandy.	Moderate: too sandy.	Moderate: too sandy.	Moderate: too sandy.
Mollville	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
LeB: Latex	Slight	Slight	Moderate: slope.	Slight.
LtC: Lilbert	Moderate: too sandy.	Moderate: too sandy.	Moderate: too sandy, slope.	Moderate: too sandy.
MaG: Maben	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.

See footnote at end of table.

TABLE 11.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
MbB, MbC: Marklake	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, percs slowly.	Severe: erodes easily.
MbE: Marklake	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.
McA*:				
Metcalf	Severe: percs slowly.	Severe: percs slowly.	Severe: percs slowly.	Moderate: wetness.
Cart	Slight	Slight	Slight	Slight.
MeB: Meth	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, small stones, percs slowly.	Slight.
Mm*:				
Mooreville	Severe: flooding.	Moderate: flooding, wetness.	Severe: flooding.	Moderate: wetness, flooding.
Mantachie	Severe: flooding, wetness.	Moderate: flooding, wetness.	Severe: wetness, flooding.	Moderate: wetness, flooding.
Nu: Nugent	Severe: flooding.	Moderate: flooding.	Severe: flooding.	Moderate: flooding.
PkC: Pickton	Moderate: too sandy.	Moderate: too sandy.	Moderate: slope, too sandy.	Moderate: too sandy.
PkE: Pickton	Moderate: slope, too sandy.	Moderate: slope, too sandy.	Severe: slope.	Moderate: too sandy.
PrB, PrC: Pirkey	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, percs slowly.	Severe: erodes easily.
PrE: Pirkey	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Severe: erodes easily.
Pt*: Pits and Dumps	Variable	Variable	Variable	Variable.
SaC: Sacul	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, percs slowly, small stones.	Slight.
Sm*:				
Sardis	Severe: flooding.	Moderate: flooding, wetness.	Severe: flooding.	Moderate: flooding.

See footnote at end of table.

TABLE 11.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
Sm*: Mathiston	Severe: flooding.	Moderate: flooding, wetness.	Severe: flooding.	Moderate: wetness, flooding.
SrA: Sawyer	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Slight.
SvA: Scottsville	Severe: wetness, percs slowly.	Severe: percs slowly.	Severe: wetness, percs slowly.	Moderate: wetness.
Sz: Socagee	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.
Ur*. Urban land	Variable	Variable	Variable	Variable.
WaE: Warnock	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
WoC: Wolfpen	Moderate: too sandy.	Moderate: too sandy.	Moderate: too sandy.	Moderate: too sandy.
WoE: Wolfpen	Moderate: too sandy, slope.	Moderate: too sandy, slope.	Severe: slope.	Moderate: too sandy.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 12.--WILDLIFE HABITAT

(See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
BaB----------------- Bernaldo	Good	Good	Good	Good	Good	---	Poor	Very poor.	Good	Good	Very poor.
Bb------------------ Bibb	Poor	Fair	Fair	Fair	Fair	---	Good	Good	Fair	Fair	Good.
BeB----------------- Bienville	Fair	Fair	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
BnA*:											
Bonn---------------	Poor	Poor	Poor	Poor	Poor	Poor	Poor	Good	Poor	Poor	Fair.
Cart---------------	Good	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
BoC----------------- Bowie	Good	Good	Good	Good	Good	---	Poor	Poor	Good	Good	Poor.
CbE, CgE------------ Cuthbert	Fair	Good	Good	Good	Good	---	Very poor.	Very poor.	Good	Good	Very poor.
CgF----------------- Cuthbert	Very poor.	Fair	Good	Good	Good	---	Very poor.	Very poor.	Fair	Good	Very poor.
Cy------------------ Cypress	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Good	Good	Very poor.	Very poor.	Good.
DbC----------------- Darbonne	Fair	Good	Good	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
DcC----------------- Darco	Poor	Fair	Good	Good	Good	---	Poor	Very poor.	Fair	Good	Very poor.
DcE----------------- Darco	Poor	Fair	Good	Good	Good	---	Very poor.	Very poor.	Fair	Good	Very poor.
DrC, DrE------------ Darden	Poor	Fair	Fair	Poor	Poor	---	Very poor.	Very poor.	Fair	Poor	Very poor.
EaC----------------- Eastwood	Fair	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
EaE----------------- Eastwood	Poor	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
EbB----------------- Elrose	Good	Good	Good	Good	Good	---	Poor	Poor	Good	Good	Poor.
EcA*:											
Erno---------------	Good	Good	Good	Good	Good	---	Poor	Poor	Good	Good	Poor.
Cart---------------	Good	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
Es------------------ Estes	Poor	Fair	Fair	Good	---	Fair	Fair	Fair	Fair	Good	Fair.

See footnote at end of table.

TABLE 12.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
GcA*:											
Guyton	Fair	Fair	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
Cart	Good	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
Iu: Iuka	Poor	Fair	Fair	Good	Good	---	Poor	Poor	Fair	Good	Poor.
KfC: Kirvin	Good	Good	Good	Good	Good	---	Poor	Very poor.	Good	Good	Very poor.
KgC: Kirvin	Fair	Good	Good	Good	Good	---	Poor	Very poor.	Good	Good	Very poor.
KsC: Kirvin	Poor	Fair	Good	Good	Good	---	Poor	Very poor.	Fair	Good	Very poor.
LaA*:											
Latch	Poor	Fair	Good	Good	Good	---	Poor	Poor	Fair	Good	Poor.
Mollville	Poor	Fair	Fair	Fair	Fair	---	Good	Good	Fair	Fair	Good.
LeB: Latex	Good	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
LtC: Lilbert	Poor	Fair	Good	Good	Good	---	Poor	Very poor.	Fair	Good	Very poor.
MaG: Maben	Very poor.	Fair	Fair	Good	Good	---	Very poor.	Very poor.	Poor	Good	Very poor.
MbB, MbC: Marklake	Good	Good	Good	Good	Good	---	Poor	Poor	Good	Good	Poor.
MbE: Marklake	Poor	Fair	Good	Good	Good	---	Poor	Very poor.	Good	Fair	Very poor.
McA*:											
Metcalf	Fair	Good	Good	Good	Good	Good	Fair	Fair	Fair	Good	Fair.
Cart	Good	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
MeB: Meth	Good	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Mm*:											
Mooreville	Poor	Fair	Fair	Good	---	Good	Poor	Poor	Fair	Good	Poor.
Mantachie	Poor	Fair	Fair	Good	---	---	Fair	Fair	Fair	Good	Fair.
Nu: Nugent	Poor	Poor	Fair	Poor	Poor	---	Very poor.	Very poor.	Poor	Poor	Very poor.
PkC, PkE: Pickton	Poor	Fair	Good	Fair	Fair	---	Poor	Very poor.	Fair	Fair	Very poor.
PrB, PrC: Pirkey	Good	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.

See footnote at end of table.

TABLE 12.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
PrE----------------Pirkey	Fair	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Pt*----------------Pits and Dumps	Very poor.	Very poor.	Very poor.	---	---	Very poor.	Very poor.	Very poor.	Very poor.	---	Very poor.
SaC----------------Sacul	Good	Good	Good	Good	Good	---	Poor	Very poor.	Good	Good	Very poor.
Sm*:											
Sardis------------	Poor	Fair	Fair	Good	---	---	Fair	Fair	Fair	Good	Fair.
Mathiston---------	Poor	Fair	Fair	Good	Good	---	Fair	Fair	Fair	Good	Fair.
SrA----------------Sawyer	Good	Good	Good	Good	Good	---	Poor	Poor	Good	Good	Poor.
SvA----------------Scottsville	Good	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
Sz-----------------Socagee	Poor	Fair	Fair	Fair	Fair	---	Good	Good	Fair	Fair	Good.
Ur*. Urban land											
WaE----------------Warnock	Poor	Fair	Good	Good	Good	---	Very poor.	Very poor.	Fair	Good	Very poor.
WoC, WoE-----------Wolfpen	Poor	Fair	Good	Good	Good	---	Poor	Very poor.	Fair	Good	Very poor.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 13.--BUILDING SITE DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the "Glossary." See text for definitions of "slight," "moderate," and "severe." The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
BaB: Bernaldo	Moderate: wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell.	Severe: low strength.	Slight.
Bb: Bibb	Severe: wetness, cutbanks cave.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding.	Severe: wetness, flooding.
BeB: Bienville	Severe: cutbanks cave.	Slight	Moderate: wetness.	Slight	Slight	Moderate: droughty.
BnA*:						
Bonn	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness, flooding.	Severe: excess sodium, wetness.
Cart	Moderate: dense layer, wetness.	Slight	Moderate: wetness.	Slight	Slight	Slight.
BoC: Bowie	Moderate: wetness.	Slight	Moderate: wetness.	Slight	Moderate: low strength.	Slight.
CbE: Cuthbert	Moderate: too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: droughty.
CgE: Cuthbert	Moderate: too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: small stones, droughty.
CgF: Cuthbert	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Moderate: small stones, droughty.
Cy: Cypress	Severe: ponding, flooding, percs slowly.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: low strength, ponding, flooding.	Severe: ponding, flooding.
DbC: Darbonne	Moderate: dense layer.	Slight	Slight	Moderate: slope.	Slight	Moderate: small stones, droughty.
DcC: Darco	Severe: cutbanks cave.	Slight	Slight	Slight	Slight	Moderate: droughty.
DcE: Darco	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope, droughty.
DrC: Darden	Severe: cutbanks cave.	Slight	Slight	Slight	Slight	Moderate: droughty, too sandy.

See footnote at end of table.

TABLE 13.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
DrE--------------- Darden	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: droughty, slope, too sandy.
EaC--------------- Eastwood	Moderate: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, low strength.	Slight.
EaE--------------- Eastwood	Moderate: too clayey, slope.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, slope.	Severe: shrink-swell, low strength.	Moderate: slope.
EbB--------------- Elrose	Moderate: too clayey.	Slight---------	Slight---------	Slight---------	Severe: low strength.	Slight.
EcA*:						
Erno-------------	Moderate: wetness.	Slight---------	Moderate: wetness.	Slight---------	Moderate: low strength.	Slight.
Cart-------------	Moderate: dense layer, wetness.	Slight---------	Moderate: wetness.	Slight---------	Slight---------	Slight.
Es---------------- Estes	Severe: ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: low strength, ponding, flooding.	Severe: ponding, too clayey.
GcA*:						
Guyton-----------	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness, flooding.	Severe: wetness.
Cart-------------	Moderate: dense layer, wetness.	Slight---------	Moderate: wetness.	Slight---------	Slight---------	Slight.
Iu---------------- Iuka	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding.	Severe: flooding.
KfC--------------- Kirvin	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: low strength.	Slight.
KgC--------------- Kirvin	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: low strength.	Severe: small stones.
KsC--------------- Kirvin	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.	Moderate: small stones.
LaA*:						
Latch------------	Severe: cutbanks cave.	Slight---------	Moderate: wetness.	Slight---------	Slight---------	Moderate: droughty.
Mollville--------	Severe: ponding, cutbanks cave.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.

See footnote at end of table.

TABLE 13.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
LeB-------------- Latex	Moderate: too clayey, wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, low strength.	Slight.
LtC-------------- Lilbert	Severe: cutbanks cave.	Slight---------	Moderate: wetness.	Slight---------	Slight---------	Moderate: droughty.
MaG-------------- Maben	Severe: slope, slippage.	Severe: slope, slippage.	Severe: slope, slippage.	Severe: slope, slippage.	Severe: low strength, slope, slippage.	Severe: slope.
MbB, MbC---------- Marklake	Slight---------	Severe: unstable fill.	Severe: unstable fill.	Severe: unstable fill.	Severe: low strength, unstable fill.	Slight.
MbE-------------- Marklake	Severe: slope.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Severe: low strength, slope, unstable fill.	Severe: slope.
McA*:						
Metcalf----------	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Severe: low strength.	Moderate: wetness.
Cart-------------	Moderate: dense layer, wetness.	Slight---------	Moderate: wetness.	Slight---------	Slight---------	Slight.
MeB-------------- Meth	Moderate: too clayey.	Moderate: shrink-swell.	Slight---------	Moderate: shrink-swell.	Severe: low strength.	Slight.
Mm*:						
Mooreville-------	Severe: wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: low strength, flooding.	Severe: flooding.
Mantachie--------	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding.	Severe: flooding.
Nu--------------- Nugent	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.
PkC-------------- Pickton	Severe: cutbanks cave.	Slight---------	Moderate: wetness.	Slight---------	Slight---------	Moderate: droughty.
PkE-------------- Pickton	Severe: cutbanks cave.	Moderate: slope.	Moderate: wetness, slope.	Severe: slope.	Moderate: slope.	Moderate: droughty, slope.
PrB, PrC---------- Pirkey	Moderate: too clayey.	Severe: unstable fill.	Severe: unstable fill.	Severe: unstable fill.	Severe: low strength, unstable fill.	Slight.
PrE-------------- Pirkey	Moderate: too clayey, slope.	Severe: unstable fill.	Severe: unstable fill.	Severe: slope, unstable fill.	Severe: low strength, unstable fill.	Moderate: slope.

See footnote at end of table.

TABLE 13.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
Pt*: Pits and Dumps	Variable	Variable	Variable	Variable	Variable	Poor: droughty, slope, thin layer.
SaC: Sacul	Moderate: too clayey, wetness.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.	Slight.
Sm*:						
Sardis	Severe: wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: low strength, flooding.	Severe: flooding.
Mathiston	Severe: wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: low strength, flooding.	Severe: flooding.
SrA: Sawyer	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Moderate: wetness, shrink-swell.	Severe: low strength.	Slight.
SvA: Scottsville	Severe: wetness.	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness.	Moderate: shrink-swell, low strength, wetness.	Moderate: wetness.
Sz: Socagee	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness, flooding.	Severe: wetness, flooding.
Ur*: Urban land	Variable	Variable	Variable	Variable	Variable	Variable.
WaE: Warnock	Moderate: wetness, slope.	Moderate: slope.	Moderate: wetness, slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: droughty, slope.
WoC: Wolfpen	Severe: cutbanks cave.	Slight	Moderate: wetness.	Slight	Slight	Moderate: droughty, too sandy.
WoE: Wolfpen	Severe: cutbanks cave.	Moderate: slope.	Moderate: wetness, slope.	Severe: slope.	Moderate: slope.	Moderate: droughty, slope, too sandy.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 14.--SANITARY FACILITIES

(Some terms that describe restrictive soil features are defined in the "Glossary." See text for definitions of "slight," "good," and other terms. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
BaB: Bernaldo	Moderate: wetness.	Moderate: seepage, slope.	Severe: wetness.	Moderate: wetness.	Fair: too clayey.
Bb: Bibb	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
BeB: Bienville	Moderate: wetness.	Severe: seepage.	Severe: seepage, wetness.	Severe: seepage.	Fair: too sandy.
BnA*:					
Bonn	Severe: flooding, wetness, percs slowly.	Severe: flooding.	Severe: flooding, wetness, excess sodium.	Severe: flooding, wetness.	Poor: wetness, excess sodium.
Cart	Severe: wetness, percs slowly.	Severe: seepage.	Moderate: wetness.	Severe: seepage.	Fair: wetness.
BoC: Bowie	Severe: wetness, percs slowly.	Moderate: seepage, slope.	Severe: wetness.	Moderate: wetness.	Fair: too clayey.
CbE, CgE: Cuthbert	Severe: percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey.
CgF: Cuthbert	Severe: percs slowly, slope.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.	Poor: too clayey, slope.
Cy: Cypress	Severe: flooding, ponding, percs slowly.	Severe: flooding, ponding.	Severe: flooding, ponding, too clayey.	Severe: flooding, ponding.	Poor: too clayey, hard to pack, ponding.
DbC: Darbonne	Severe: percs slowly.	Severe: seepage.	Slight	Slight	Poor: small stones.
DcC: Darco	Severe: poor filter.	Severe: seepage.	Severe: too sandy.	Severe: seepage.	Poor: too sandy.
DcE: Darco	Severe: poor filter.	Severe: seepage, slope.	Severe: too sandy.	Severe: seepage.	Poor: too sandy.
DrC: Darden	Severe: poor filter.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Poor: seepage.
DrE: Darden	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Poor: seepage.

See footnote at end of table.

TABLE 14.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
EaC----------------- Eastwood	Severe: percs slowly.	Moderate: slope.	Severe: too clayey.	Slight-----------	Poor: too clayey, hard to pack.
EaE----------------- Eastwood	Severe: percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey, hard to pack.
EbB----------------- Elrose	Moderate: percs slowly.	Severe: seepage.	Severe: too clayey.	Slight-----------	Poor: too clayey.
EcA*:					
Erno---------------	Severe: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Fair: wetness.
Cart---------------	Severe: wetness, percs slowly.	Severe: seepage.	Moderate: wetness.	Severe: seepage.	Fair: wetness.
Es------------------ Estes	Severe: flooding, ponding, percs slowly.	Severe: flooding, ponding.	Severe: flooding, ponding, too clayey.	Severe: flooding, ponding.	Poor: too clayey, hard to pack, ponding.
GcA*:					
Guyton-------------	Severe: flooding, wetness, percs slowly.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
Cart---------------	Severe: wetness, percs slowly.	Severe: seepage.	Moderate: wetness.	Severe: seepage.	Fair: wetness.
Iu------------------ Iuka	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Fair: wetness.
KfC, KgC, KsC------- Kirvin	Severe: percs slowly.	Moderate: slope.	Severe: too clayey.	Slight-----------	Poor: too clayey, hard to pack.
LaA*:					
Latch--------------	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage.	Severe: seepage.	Fair: too sandy, wetness.
Mollville----------	Severe: ponding, percs slowly.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Poor: ponding.
LeB----------------- Latex	Severe: wetness, percs slowly.	Moderate: seepage, slope.	Moderate: wetness, too clayey.	Slight-----------	Fair: too clayey, wetness, thin layer.
LtC----------------- Lilbert	Moderate: percs slowly.	Severe: seepage.	Moderate: wetness.	Severe: seepage.	Good.

See footnote at end of table.

TABLE 14.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
MaG: Maben	Severe: percs slowly, slope, slippage.	Severe: slope, slippage.	Severe: slope, slippage.	Severe: slope.	Poor: slope.
MbB, MbC: Marklake	Severe: percs slowly.	Severe: unstable fill.	Severe: unstable fill.	Severe: unstable fill.	Fair: too clayey.
MbE: Marklake	Severe: percs slowly, slope.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Severe: unstable fill.	Poor: slope.
McA*:					
Metcalf	Severe: wetness, percs slowly.	Slight	Severe: wetness.	Moderate: wetness.	Poor: thin layer.
Cart	Severe: wetness, percs slowly.	Severe: seepage.	Moderate: wetness.	Severe: seepage.	Fair: wetness.
MeB: Meth	Severe: percs slowly.	Severe: slope.	Slight	Slight	Good.
Mm*:					
Mooreville	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Fair: too clayey, wetness.
Mantachie	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
Nu: Nugent	Severe: flooding, wetness.	Severe: seepage, flooding.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage.	Poor: seepage.
PkC: Pickton	Severe: poor filter.	Severe: seepage.	Severe: wetness, too sandy.	Severe: seepage.	Poor: too sandy.
PkE: Pickton	Severe: poor filter.	Severe: seepage, slope.	Severe: wetness, too sandy.	Severe: seepage.	Poor: too sandy.
PrB, PrC: Pirkey	Severe: percs slowly.	Severe: unstable fill.	Severe: unstable fill.	Severe: unstable fill.	Poor: too clayey.
PrE: Pirkey	Severe: percs slowly.	Severe: slope, unstable fill.	Severe: unstable fill.	Severe: unstable fill.	Poor: too clayey.
Pt*: Pits and Dumps	Variable	Variable	Variable	Variable	Poor: slope, thin layer.
SaC: Sacul	Severe: percs slowly, wetness.	Moderate: slope.	Severe: too clayey.	Moderate: wetness.	Poor: too clayey, hard to pack.

See footnote at end of table.

TABLE 14.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
Sm*:					
Sardis	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding.	Severe: flooding.	Fair: wetness, too clayey.
Mathiston	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Fair: too clayey, wetness.
SrA Sawyer	Severe: wetness, percs slowly.	Slight	Severe: too clayey.	Moderate: wetness.	Poor: too clayey, hard to pack.
SvA Scottsville	Severe: wetness, percs slowly.	Moderate: seepage.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
Sz Socagee	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
Ur* Urban land	Variable	Variable	Variable	Variable	Variable.
WaE Warnock	Moderate: wetness, percs slowly, slope.	Severe: seepage, slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, slope.
WoC Wolfpen	Severe: poor filter.	Severe: seepage.	Severe: wetness.	Severe: seepage.	Fair: too clayey.
WoE Wolfpen	Severe: poor filter.	Severe: seepage, slope.	Severe: wetness.	Severe: seepage.	Fair: too clayey, slope.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 15.--CONSTRUCTION MATERIALS

(Some terms that describe restrictive soil features are defined in the "Glossary." See text for definitions of "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
BaB------------------- Bernaldo	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
Bb-------------------- Bibb	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness, small stones.
BeB------------------- Bienville	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too sandy.
BnA*:				
Bonn------------------	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness, excess sodium.
Cart------------------	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim.
BoC------------------- Bowie	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
CbE, CgE-------------- Cuthbert	Fair: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
CgF------------------- Cuthbert	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
Cy-------------------- Cypress	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
DbC------------------- Darbonne	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
DcC------------------- Darco	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too sandy.
DcE------------------- Darco	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too sandy, slope.
DrC, DrE-------------- Darden	Good	Probable	Improbable: too sandy.	Poor: too sandy.
EaC, EaE-------------- Eastwood	Fair: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
EbB------------------- Elrose	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.

See footnote at end of table.

TABLE 15.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
EcA*:				
Erno	Fair: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
Cart	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim.
Es Estes	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
GcA*:				
Guyton	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
Cart	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim.
Iu Iuka	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
KfC, KgC, KsC Kirvin	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
LaA*:				
Latch	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: too sandy.
Mollville	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
LeB Latex	Fair: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones.
LtC Lilbert	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too sandy.
MaG Maben	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
MbB, MbC Marklake	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones.
MbE Marklake	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
McA*:				
Metcalf	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: thin layer, too clayey.
Cart	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim.
MeB Meth	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.

See footnote at end of table.

TABLE 15.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
Mm*:				
Mooreville	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
Mantachie	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones.
Nu Nugent	Good	Probable	Improbable: too sandy.	Fair: too sandy, small stones.
PkC, PkE Pickton	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: too sandy.
PrB, PrC, PrE Pirkey	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Pt* Pits and Dumps	Poor: thin layer.	Variable	Variable	Poor: thin layer, slope.
SaC Sacul	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Sm*:				
Sardis	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
Mathiston	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
SrA Sawyer	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: thin layer.
SvA Scottsville	Poor: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, thin layer.
Sz Socagee	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
Ur* Urban land	Variable	Variable	Variable	Variable.
WaE Warnock	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, slope, too clayey.
WoC Wolfpen	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too sandy.
WoE Wolfpen	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too sandy, slope.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 16.--WATER MANAGEMENT

(Some terms that describe restrictive soil features are defined in the "Glossary." See text for definitions of "slight," "moderate," and "severe." The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
BaB: Bernaldo	Moderate: seepage.	Moderate: piping.	Deep to water	Favorable	Favorable	Favorable.
Bb: Bibb	Moderate: seepage.	Severe: piping, wetness.	Flooding	Wetness, flooding.	Erodes easily, wetness.	Erodes easily, wetness.
BeB: Bienville	Severe: seepage.	Severe: piping, seepage.	Deep to water	Droughty, fast intake.	Soil blowing	Droughty.
BnA*:						
Bonn	Slight	Severe: wetness, excess sodium.	Percs slowly, flooding, excess sodium.	Wetness, droughty, percs slowly.	Erodes easily, wetness, percs slowly.	Wetness, excess sodium, erodes easily.
Cart	Severe: seepage.	Severe: piping.	Deep to water	Percs slowly, rooting depth.	Erodes easily	Erodes easily, rooting depth.
BoC: Bowie	Severe: slow refill.	Moderate: piping, wetness.	Deep to water	Slope	Favorable	Rooting depth.
CbE: Cuthbert	Slight	Moderate: piping.	Deep to water	Slope, droughty.	Slope, erodes easily, percs slowly.	Slope, erodes easily, droughty.
CgE, CgF: Cuthbert	Slight	Moderate: piping.	Deep to water	Slope, droughty.	Slope	Slope, droughty.
Cy: Cypress	Slight	Severe: hard to pack, ponding.	Ponding, percs slowly, flooding.	Ponding, percs slowly, flooding.	Ponding, percs slowly.	Wetness, erodes easily, percs slowly.
DbC: Darbonne	Moderate: slope, seepage.	Moderate: seepage, thin layer, piping.	Deep to water	Droughty, slope.	Favorable	Droughty.
DcC: Darco	Severe: seepage.	Severe: seepage, piping.	Deep to water	Droughty, fast intake, slope.	Too sandy, soil blowing.	Droughty.
DcE: Darco	Severe: seepage.	Severe: seepage, piping.	Deep to water	Droughty, fast intake, slope.	Too sandy, slope, soil blowing.	Droughty, slope.
DrC: Darden	Severe: seepage.	Severe: seepage, piping.	Deep to water	Droughty, fast intake, slope.	Favorable	Droughty.
DrE: Darden	Severe: seepage.	Severe: seepage, piping.	Deep to water	Droughty, fast intake, slope.	Slope	Slope, droughty.

See footnote at end of table.

TABLE 16.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
EaC: Eastwood	Slight	Severe: hard to pack.	Deep to water	Slope, percs slowly, erodes easily.	Erodes easily, percs slowly.	Erodes easily, percs slowly.
EaE: Eastwood	Slight	Severe: hard to pack.	Deep to water	Slope, percs slowly, erodes easily.	Slope, erodes easily, percs slowly.	Slope, erodes easily, percs slowly.
EbB: Elrose	Moderate: seepage.	Moderate: hard to pack.	Deep to water	Favorable	Soil blowing	Favorable.
EcA*:						
Erno	Moderate: seepage.	Severe: piping.	Percs slowly	Wetness, percs slowly, rooting depth.	Erodes easily, wetness, rooting depth.	Erodes easily, rooting depth, percs slowly.
Cart	Severe: seepage.	Severe: piping.	Deep to water	Percs slowly, rooting depth.	Erodes easily	Erodes easily, rooting depth.
Es: Estes	Slight	Severe: ponding.	Ponding, percs slowly, flooding.	Ponding, slow intake, percs slowly.	Ponding, percs slowly.	Wetness, percs slowly.
GcA*:						
Guyton	Moderate: seepage.	Severe: piping, wetness.	Percs slowly, flooding.	Wetness, percs slowly, erodes easily.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.
Cart	Severe: seepage.	Severe: piping.	Deep to water	Percs slowly, rooting depth.	Erodes easily	Erodes easily, rooting depth.
Iu: Iuka	Moderate: seepage.	Severe: piping, wetness.	Flooding	Wetness, flooding.	Wetness	Wetness.
KfC: Kirvin	Slight	Severe: hard to pack.	Deep to water	Percs slowly, slope.	Erodes easily	Erodes easily.
KgC, KsC: Kirvin	Slight	Severe: hard to pack.	Deep to water	Percs slowly, slope.	Favorable	Favorable.
LaA*:						
Latch	Severe: seepage.	Severe: piping, seepage.	Deep to water	Droughty, fast intake.	Wetness	Droughty.
Mollville	Moderate: seepage.	Severe: ponding.	Percs slowly, ponding.	Erodes easily, ponding, percs slowly.	Erodes easily, ponding, percs slowly.	Erodes easily, wetness, percs slowly.
LeB: Latex	Moderate: seepage.	Severe: piping.	Deep to water	Percs slowly, erodes easily.	Erodes easily	Erodes easily.
LtC: Lilbert	Moderate: seepage.	Moderate: piping.	Deep to water	Droughty, fast intake, slope.	Soil blowing	Droughty.
MaG: Maben	Severe: slope.	Severe: piping.	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.

See footnote at end of table.

TABLE 16.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
MbB------------- Marklake	Slight---------	Severe: piping.	Deep to water	Percs slowly, erodes easily.	Erodes easily, percs slowly.	Erodes easily, percs slowly.
MbC------------- Marklake	Slight---------	Severe: piping.	Deep to water	Slope, percs slowly, erodes easily.	Erodes easily, percs slowly.	Erodes easily, percs slowly.
MbE------------- Marklake	Slight---------	Severe: piping.	Deep to water	Slope, percs slowly, erodes easily.	Slope, erodes easily, percs slowly.	Slope, erodes easily, percs slowly.
McA*:						
Metcalf----------	Slight---------	Moderate: piping, wetness.	Percs slowly---	Wetness, percs slowly, erodes easily.	Erodes easily, wetness.	Erodes easily, percs slowly.
Cart-------------	Severe: seepage.	Severe: piping.	Deep to water	Percs slowly, rooting depth.	Erodes easily	Erodes easily, rooting depth.
MeB------------- Meth	Moderate: seepage.	Severe: piping.	Deep to water	Favorable------	Favorable------	Favorable.
Mm*:						
Mooreville-------	Moderate: seepage.	Severe: wetness.	Flooding-------	Wetness, erodes easily, flooding.	Erodes easily, wetness.	Erodes easily.
Mantachie--------	Moderate: seepage.	Severe: piping, wetness.	Flooding-------	Wetness, flooding.	Wetness--------	Wetness.
Nu--------------- Nugent	Severe: seepage.	Severe: seepage, piping.	Deep to water	Droughty, flooding.	Erodes easily, too sandy.	Erodes easily, droughty.
PkC-------------- Pickton	Severe: seepage.	Severe: seepage, piping.	Deep to water	Droughty, fast intake, slope.	Too sandy, soil blowing.	Droughty.
PkE-------------- Pickton	Severe: seepage.	Severe: seepage, piping.	Deep to water	Droughty, fast intake, slope.	Slope, too sandy, soil blowing.	Slope, droughty.
PrB, PrC---------- Pirkey	Moderate: slope.	Moderate: piping.	Deep to water	Slope, percs slowly, rooting depth.	Erodes easily, percs slowly.	Erodes easily, rooting depth.
PrE-------------- Pirkey	Severe: slope.	Moderate: piping.	Deep to water	Slope, percs slowly, rooting depth.	Slope, erodes easily, percs slowly.	Slope, erodes easily, rooting depth.
Pt*-------------- Pits and Dumps	Variable-------	Variable-------	Variable-------	Variable-------	Variable-------	Variable.
SaC-------------- Sacul	Slight---------	Moderate: hard to pack, wetness.	Percs slowly, slope.	Slope, percs slowly, wetness.	Percs slowly, wetness.	Percs slowly.

See footnote at end of table.

TABLE 16.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
Sm*:						
Sardis	Moderate: seepage.	Severe: piping.	Flooding	Wetness, erodes easily, flooding.	Erodes easily, wetness.	Erodes easily.
Mathiston	Moderate: seepage.	Severe: wetness.	Flooding	Wetness, erodes easily, flooding.	Erodes easily, wetness.	Erodes easily.
SrA-Sawyer	Slight	Moderate: hard to pack, wetness.	Percs slowly	Wetness, percs slowly.	Erodes easily, wetness, percs slowly.	Erodes easily, percs slowly.
SvA-Scottsville	Slight	Severe: hard to pack.	Percs slowly	Wetness, percs slowly, erodes easily.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.
Sz-Socagee	Slight	Severe: piping, wetness.	Flooding	Wetness, flooding.	Wetness	Wetness.
Ur*-Urban land	Variable	Variable	Variable	Variable	Variable	Variable.
WaE-Warnock	Moderate: seepage.	Severe: piping.	Deep to water	Slope, droughty, fast intake.	Slope, soil blowing.	Slope, droughty.
WoC-Wolfpen	Severe: seepage.	Severe: thin layer.	Deep to water	Droughty, fast intake, slope.	Favorable	Droughty.
WoE-Wolfpen	Severe: seepage.	Severe: thin layer.	Deep to water	Droughty, fast intake, slope.	Slope	Slope, droughty.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 17.--ENGINEERING INDEX PROPERTIES

(The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated)

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
BaB: Bernaldo	0-11	Fine sandy loam	SM, ML	A-4	0	100	95-100	90-100	40-60	<25	NP-4
	11-43	Loam, sandy clay loam, clay loam.	CL	A-6	0	99-100	98-100	90-100	51-75	26-40	12-24
	43-80	Fine sandy loam, sandy clay loam, loam.	CL, SC, ML, SM	A-4, A-6, A-2-4, A-2-6	0	100	95-100	90-100	28-65	20-40	3-22
Bb: Bibb	0-8	Silt loam	ML, CL-ML	A-4	0-5	95-100	90-100	80-90	50-80	<25	NP-7
	8-64	Sandy loam, loam, silt loam.	SM, SM-SC, ML, CL-ML	A-2, A-4	0-10	60-100	50-100	40-100	30-90	<30	NP-7
BeB: Bienville	0-50	Loamy fine sand	SM	A-2-4, A-4	0	100	100	90-100	15-50	<25	NP-3
	50-80	Loamy fine sand, fine sandy loam, fine sand.	SM, ML	A-2-4, A-4	0	100	100	90-100	20-55	<25	NP-3
BnA*: Bonn	0-12	Silt loam	ML, CL-ML	A-4	0	100	100	95-100	75-100	<28	NP-7
	12-43	Silt loam, silty clay loam, loam.	CL	A-6, A-7-6	0	95-100	90-100	85-100	65-100	30-44	12-22
	43-80	Silt loam, silty clay loam, loam.	CL	A-6, A-4	0	100	95-100	90-100	75-100	28-40	8-18
Cart	0-3	Very fine sandy loam.	CL, CL-ML, ML	A-4	0	100	98-100	95-100	51-75	10-25	2-10
	3-20	Loam, fine sandy loam, very fine sandy loam.	CL-ML, ML, CL	A-4	0	100	98-100	95-100	51-75	15-30	2-10
	20-57	Loam, fine sandy loam, very fine sandy loam.	CL-ML, CL	A-4, A-6	0	98-100	95-100	90-100	51-75	18-35	4-12
	57-62	Sandy clay loam, loam, fine sandy loam.	CL-ML, CL	A-4, A-6	0	98-100	95-100	90-100	51-75	20-40	4-18
	62-80	Clay loam, sandy clay loam, sandy clay.	CL, SC	A-6, A-7	0	98-100	95-100	80-95	40-80	30-42	16-24
BoC: Bowie	0-10	Very fine sandy loam.	SM, SM-SC, ML, CL-ML	A-2-4, A-4	0	97-100	94-100	90-100	30-55	<25	NP-6
	10-31	Sandy clay loam, clay loam, fine sandy loam.	SC, CL	A-4, A-6	0	90-100	87-100	80-100	40-72	20-40	8-25
	31-68	Sandy clay loam, clay loam, fine sandy loam.	SC, CL	A-4, A-6, A-2	0	80-100	70-100	65-100	34-77	20-40	8-25
	68-83	Sandy clay loam, clay loam, sandy clay.	CL	A-6, A-7	0	95-100	90-100	75-100	51-80	31-49	14-30

See footnote at end of table.

TABLE 17.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
CbE-------------- Cuthbert	0-6	Fine sandy loam	SM, ML, SM-SC, CL-ML	A-2-4, A-4	0-1	85-100	78-100	75-98	20-55	<32	NP-7
	6-26	Sandy clay loam, sandy clay, clay.	SC, CL, CH	A-6, A-7-6	0-1	95-100	88-100	80-100	45-98	37-64	19-40
	26-34	Sandy clay loam, clay, shaly clay.	SC, CL	A-6, A-7, A-2-6, A-2-7	0-1	89-100	85-100	80-100	28-84	29-45	11-26
	34-60	Stratified fine sandy loam to very shaly clay.	SC, CL	A-6, A-7, A-2-6, A-2-7	0-3	89-100	85-100	80-100	28-84	21-45	7-26
CgE-------------- Cuthbert	0-14	Gravelly fine sandy loam.	SM, GM, GM-GC, SM-SC	A-1-b, A-2-4, A-4	0-5	60-88	50-80	35-75	20-49	<32	NP-7
	14-30	Sandy clay loam, sandy clay, clay.	SC, CL, CH	A-6, A-7-6	0-1	95-100	88-100	80-100	45-98	37-64	19-40
	30-36	Sandy clay loam, clay, shaly clay.	SC, CL	A-6, A-7, A-2-6, A-2-7	0-1	89-100	85-100	80-100	28-84	29-45	11-26
	36-60	Stratified fine sandy loam to very shaly clay.	SC, CL	A-6, A-7, A-2-6, A-2-7	0-3	89-100	85-100	80-100	28-84	21-45	7-26
CgF-------------- Cuthbert	0-9	Gravelly fine sandy loam.	SM, GM, GM-GC, SM-SC	A-1-b, A-2-4, A-4	0-5	60-88	50-80	35-75	20-49	<32	NP-7
	9-29	Sandy clay loam, sandy clay, clay.	SC, CL, CH	A-6, A-7-6	0-1	95-100	88-100	80-100	45-98	37-64	19-40
	29-39	Sandy clay loam, clay, shaly clay.	SC, CL	A-6, A-7, A-2-6, A-2-7	0-1	89-100	85-100	80-100	28-84	29-45	11-26
	39-60	Stratified fine sandy loam to very shaly clay.	SC, CL	A-6, A-7, A-2-6, A-2-7	0-3	89-100	85-100	80-100	28-84	21-45	7-26
Cy--------------- Cypress	0-6	Clay loam--------	CL	A-6, A-7	0	100	100	90-100	75-95	34-48	14-25
	6-60	Clay loam, clay, silty clay.	CL, CH	A-7-6	0	100	100	90-100	75-95	43-66	21-39
DbC-------------- Darbonne	0-33	Fine sandy loam	SM, SM-SC, CL-ML, SC	A-2-4, A-4	0-5	80-95	70-90	50-90	30-55	<25	NP-10
	33-41	Gravelly fine sandy loam, gravelly sandy clay loam.	SM, SC, GC, GM	A-1-b, A-2-4, A-4, A-6	2-15	40-75	35-65	30-60	20-45	<30	NP-15
	41-80	Fine sandy loam, loam, sandy clay loam.	SM-SC, CL-ML, CL, SC	A-2-4, A-4, A-6, A-2-6	0-2	80-95	75-90	70-85	30-55	16-35	5-20
DcC-------------- Darco	0-3	Loamy fine sand	SM	A-2-4	0-2	95-100	95-100	75-100	15-30	<27	NP-3
	3-66	Loamy fine sand, fine sand.	SM	A-2-4	0-2	95-100	95-100	75-100	15-30	<20	NP-3
	66-80	Sandy clay loam, fine sandy loam.	SC, CL	A-6, A-7-6, A-2-4	0	95-100	95-100	80-100	23-55	25-45	9-28
	80-90	Sandy clay loam, fine sandy loam.	SC, SM-SC	A-2, A-4, A-6	0	95-100	95-100	75-100	23-50	20-40	5-18

See footnote at end of table.

TABLE 17.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
DcE-------------- Darco	0-3	Loamy fine sand	SM	A-2-4	0-2	95-100	95-100	75-100	15-30	<27	NP-3
	3-69	Loamy fine sand, fine sand.	SM	A-2-4	0-2	95-100	95-100	75-100	15-30	<20	NP-3
	69-77	Sandy clay loam, fine sandy loam.	SC, CL	A-6, A-7-6, A-2-4	0	95-100	95-100	80-100	23-55	25-45	9-28
	77-90	Sandy clay loam, fine sandy loam.	SC, SM-SC	A-2, A-4, A-6	0	95-100	95-100	75-100	23-50	20-40	5-18
DrC-------------- Darden	0-19	Fine sand--------	SM, SP-SM	A-2, A-3	0	100	100	90-100	5-35	<20	NP-3
	19-80	Loamy fine sand	SM, SP-SM	A-2	0	100	100	90-100	10-35	<20	NP-3
DrE-------------- Darden	0-7	Fine sand--------	SM, SP-SM	A-2, A-3	0	100	100	90-100	5-35	<20	NP-3
	7-80	Loamy fine sand	SM, SP-SM	A-2	0	100	100	90-100	10-35	<20	NP-3
EaC-------------- Eastwood	0-8	Very fine sandy loam.	CL, SM-SC, CL-ML, ML	A-4, A-6	0	98-100	98-100	95-100	40-89	20-37	3-20
	8-37	Clay, silty clay	CH, CL	A-7-6	0	100	95-100	90-100	70-98	40-75	25-48
	37-51	Clay loam, silty clay loam, loam.	CL, CH	A-6, A-7-6	0	100	95-100	90-100	55-99	35-65	15-45
	51-72	Stratified fine sandy loam to shaly silty clay loam.	CL, SC, CL-ML, SM-SC	A-6, A-4, A-7-6	0	95-100	95-100	90-100	40-98	25-68	5-44
EaE-------------- Eastwood	0-4	Very fine sandy loam.	CL, SM-SC, CL-ML, ML	A-4, A-6	0	98-100	98-100	95-100	40-89	20-37	3-20
	4-24	Clay, silty clay	CH, CL	A-7-6	0	100	95-100	90-100	70-98	40-75	25-48
	24-46	Clay loam, silty clay loam, loam.	CL, CH	A-6, A-7-6	0	100	95-100	90-100	55-99	35-65	15-45
	46-60	Stratified fine sandy loam to shaly silty clay loam.	CL, SC, CL-ML, SM-SC	A-6, A-4, A-7-6	0	95-100	95-100	90-100	40-98	25-68	5-44
EbB-------------- Elrose	0-11	Fine sandy loam	SM, SM-SC	A-2-4, A-4	0	85-100	78-100	70-99	30-47	<25	NP-7
	11-19	Sandy clay loam, clay loam, loam.	SC, CL	A-4, A-6	0	90-100	85-100	80-99	36-65	20-39	8-23
	19-80	Clay loam, sandy clay, clay.	CL, CH	A-6, A-7	0	90-100	80-100	80-100	50-97	32-65	16-37
EcA*:											
Erno------------	0-9	Very fine sandy loam.	ML, CL, CL-ML	A-4	0	100	100	85-99	60-85	15-30	2-10
	9-36	Clay loam, loam, fine sandy loam.	CL-ML, CL	A-4, A-6	0	98-100	98-100	95-100	51-85	18-40	4-21
	36-88	Clay loam, loam, fine sandy loam.	CL-ML, CL	A-4, A-6	0	98-100	98-100	95-100	51-85	20-40	5-21
Cart------------	0-3	Very fine sandy loam.	CL, CL-ML, ML	A-4	0	100	98-100	95-100	51-75	10-25	2-10
	3-22	Loam, fine sandy loam, very fine sandy loam.	CL-ML, ML, CL	A-4	0	100	98-100	95-100	51-75	15-30	2-10
	22-43	Loam, fine sandy loam, very fine sandy loam.	CL-ML, CL	A-4, A-6	0	98-100	95-100	90-100	51-75	18-35	4-12
	43-80	Sandy clay loam, loam, fine sandy loam.	CL-ML, CL	A-4, A-6	0	98-100	95-100	90-100	51-75	20-40	4-18

See footnote at end of table.

TABLE 17.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments 3-10 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
Es---------------- Estes	0-4	Clay-------------	CL, CH	A-7-6	0	100	100	95-100	69-100	41-55	23-35
	4-65	Silty clay, clay	CL, CH	A-7-6	0	100	100	95-100	75-100	41-60	25-40
	65-80	Silty clay loam, clay loam, sandy clay loam.	CL	A-7-6, A-6	0	100	100	95-100	65-95	30-46	15-30
GcA*:											
Guyton-----------	0-17	Silt loam--------	ML, CL-ML	A-4	0	100	100	95-100	65-90	<27	NP-7
	17-58	Silt loam, silty clay loam, clay loam.	CL, CL-ML	A-6, A-4	0	100	100	94-100	75-95	22-40	6-18
	58-80	Silt loam, silty clay loam, sandy clay loam.	CL, CL-ML, ML	A-6, A-4	0	100	100	95-100	50-95	<40	NP-18
Cart-------------	0-3	Very fine sandy loam.	CL, CL-ML, ML	A-4	0	100	98-100	95-100	51-75	10-25	2-10
	3-23	Loam, fine sandy loam, very fine sandy loam.	CL-ML, ML, CL	A-4	0	100	98-100	95-100	51-75	15-30	2-10
	23-50	Loam, fine sandy loam, very fine sandy loam.	CL-ML, CL	A-4, A-6	0	98-100	95-100	90-100	51-75	18-35	4-12
	50-70	Sandy clay loam, loam, fine sandy loam.	CL-ML, CL	A-4, A-6	0	98-100	95-100	90-100	51-75	20-40	4-18
	70-80	Clay loam, sandy clay loam, sandy clay.	CL, SC	A-6, A-7	0	98-100	95-100	80-95	40-80	30-42	16-24
Iu---------------- Iuka	0-4	Fine sandy loam	SM, SM-SC, ML, CL-ML	A-4, A-2	0	95-100	90-100	70-100	30-60	<20	NP-7
	4-45	Fine sandy loam, loam, sandy loam.	SM, SM-SC, ML, CL-ML	A-4	0	95-100	85-100	65-100	36-75	<30	NP-7
	45-80	Sandy loam, fine sandy loam, loam.	SM, ML	A-2, A-4	0	95-100	90-100	70-100	25-60	<30	NP-7
KfC--------------- Kirvin	0-14	Very fine sandy loam.	SM, ML, CL, SC	A-4	0-2	85-100	78-98	70-95	36-70	<30	NP-8
	14-41	Clay loam, sandy clay, clay.	CL, CH	A-7	0-1	95-100	90-100	85-100	53-95	42-67	24-43
	41-50	Sandy clay loam, clay loam, clay.	CL, CH	A-6, A-7	0-1	95-100	90-100	75-100	51-90	32-59	16-32
	50-61	Stratified sandy clay loam to very shaly clay.	SC, CL, CH	A-4, A-6, A-7	0-1	95-100	90-100	50-90	36-80	25-52	9-32
KgC--------------- Kirvin	0-8	Gravelly fine sandy loam.	SM, GM, SC, GM-GC	A-2-4, A-4	0-5	55-92	47-80	40-75	25-49	<30	NP-8
	8-32	Clay loam, sandy clay, clay.	CL, CH	A-7	0-1	95-100	90-100	85-100	53-95	42-67	24-43
	32-41	Sandy clay loam, clay loam, clay.	CL, CH	A-6, A-7	0-1	95-100	90-100	75-100	51-90	32-59	16-32
	41-61	Stratified sandy clay loam to very shaly clay.	SC, CL, CH	A-4, A-6, A-7	0-1	95-100	90-100	50-90	36-80	25-52	9-32

See footnote at end of table.

TABLE 17.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
KsC-------------- Kirvin	0-3	Gravelly fine sandy loam.	SM, GM	A-2-4, A-4	0-5	55-78	50-78	35-70	26-49	<25	NP-4
	3-10	Clay, sandy clay, clay loam.	CL, CH	A-7	0-2	95-100	88-100	84-99	51-95	45-67	24-43
	10-28	Sandy clay loam, clay loam, clay.	CL, CH	A-6, A-7	0-1	95-100	90-100	85-99	51-90	32-52	16-32
	28-60	Stratified sandy clay loam to very shaly clay.	SC, CL, CH	A-4, A-6, A-7	0-1	95-100	90-100	50-90	36-80	25-52	9-32
LaA*:											
Latch-----------	0-7	Loamy fine sand	SM, SM-SC	A-2-4, A-4	0	95-100	95-100	80-100	15-40	<25	NP-6
	7-55	Loamy fine sand, fine sand.	SM, SM-SC	A-2-4, A-4	0	95-100	95-100	80-100	15-40	<25	NP-6
	55-72	Sandy clay loam, loam, fine sandy loam.	SC, CL	A-4, A-6	0	95-100	95-100	80-100	40-55	25-39	7-20
	72-80	Loamy fine sand, fine sand, sand.	SM, SP-SM, SM-SC	A-3, A-2-4	0	95-100	95-100	65-95	5-25	<22	NP-6
Mollville-------	0-8	Loam-------------	ML, CL-ML, CL	A-4, A-6	0	100	100	85-100	50-80	25-40	3-15
	8-36	Sandy clay loam, loam.	CL, SC	A-6, A-4	0	100	100	90-100	45-75	25-40	8-22
	36-48	Clay loam, sandy clay loam.	CL	A-6	0	100	100	90-100	70-80	30-40	11-20
	48-62	Loamy fine sand, fine sandy loam, clay loam.	SM, ML, SM-SC, CL-ML	A-2, A-4	0	95-100	95-100	60-80	20-80	<25	NP-8
LeB-------------- Latex	0-10	Fine sandy loam	SM, SM-SC, SC, CL	A-2-4, A-4	0	99-100	96-100	90-100	45-75	19-30	2-9
	10-33	Loam, clay loam, sandy clay loam.	CL-ML, CL	A-4, A-6	0	99-100	95-100	90-100	51-80	20-40	6-25
	33-42	Loam, clay loam, sandy clay loam.	CL-ML, CL, SC	A-4, A-6	0-2	75-100	64-95	62-95	41-80	20-40	6-25
	42-75	Clay, silty clay, clay loam.	CH, CL	A-7-6	0	99-100	95-100	90-100	75-98	41-70	20-43
	75-80	Stratified fine sandy loam to clay loam.	SM-SC, SC, CL, CL-ML	A-4, A-6	0	99-100	95-100	90-100	45-75	20-40	6-25
LtC-------------- Lilbert	0-9	Loamy fine sand	SM	A-2-4, A-4	0	95-100	95-100	80-100	17-40	<20	NP-3
	9-23	Loamy fine sand	SM	A-2-4, A-4	0	95-100	95-100	80-100	17-40	<20	NP-3
	23-43	Sandy clay loam, fine sandy loam.	SC, CL	A-6, A-4	0	95-100	95-100	85-100	36-55	23-39	8-22
	43-80	Sandy clay loam, fine sandy loam.	SC, CL	A-6, A-4, A-2-4, A-2-6	0	90-100	90-100	85-100	30-55	22-39	8-20

See footnote at end of table.

TABLE 17.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification Unified	Classification AASHTO	Frag- ments 3-10 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
MaG-------------- Maben	0-3	Very fine sandy loam.	CL-ML, CL	A-4, A-6	0	95-100	90-100	80-95	50-70	18-40	5-20
	3-18	Clay, clay loam, silty clay.	MH	A-7	0	90-100	90-100	90-100	75-95	50-80	18-40
	18-32	Stratified loam to weathered bedrock.	CL, ML, CH, MH	A-6, A-7	0	95-100	80-95	70-90	60-75	30-60	11-25
	32-60	Stratified fine sandy loam to weathered bedrock.	SC, SM-SC, CL, CL-ML	A-4, A-6	0	95-100	80-95	70-85	40-55	20-36	5-20
MbB-------------- Marklake	0-6	Fine sandy loam	CL, ML, CL-ML	A-4, A-6	0-2	98-100	95-100	75-98	65-90	15-35	NP-15
	6-60	Sandy clay loam, clay loam, fine sandy loam.	CL, CL-ML	A-4, A-6, A-7	0-2	98-100	95-100	75-98	65-90	20-41	6-20
MbC-------------- Marklake	0-8	Fine sandy loam	CL, ML, CL-ML	A-4, A-6	0-2	98-100	95-100	75-98	65-90	15-35	NP-15
	8-60	Sandy clay loam, clay loam, fine sandy loam.	CL, CL-ML	A-4, A-6, A-7	0-2	98-100	95-100	75-98	65-90	20-41	6-20
MbE-------------- Marklake	0-3	Sandy clay loam	CL, CL-ML	A-4, A-6, A-7	0-2	98-100	95-100	75-98	65-90	20-41	6-20
	3-60	Sandy clay loam, clay loam, fine sandy loam.	CL, CL-ML	A-4, A-6, A-7	0-2	98-100	95-100	75-98	65-90	20-41	6-20
McA*:											
Metcalf---------	0-10	Silt loam--------	ML, CL-ML	A-4	0	100	100	90-100	65-90	<25	NP-6
	10-29	Silt loam, loam, clay loam.	CL	A-6	0	100	100	90-100	65-95	31-40	11-18
	29-73	Silty clay, clay, clay loam.	CH, CL	A-7-6	0	100	100	95-100	85-100	46-66	20-38
Cart------------	0-4	Very fine sandy loam.	CL, CL-ML, ML	A-4	0	100	98-100	95-100	51-75	10-25	2-10
	4-28	Loam, fine sandy loam, very fine sandy loam.	CL-ML, ML, CL	A-4	0	100	98-100	95-100	51-75	15-30	2-10
	28-50	Loam, fine sandy loam, very fine sandy loam.	CL-ML, CL	A-4, A-6	0	98-100	95-100	90-100	51-75	18-35	4-12
	50-77	Sandy clay loam, loam, fine sandy loam.	CL-ML, CL	A-4, A-6	0	98-100	95-100	90-100	51-75	20-40	4-18
	77-80	Clay loam, sandy clay loam, sandy clay.	CL, SC	A-6, A-7	0	98-100	95-100	80-95	40-80	30-42	16-24
MeB-------------- Meth	0-6	Fine sandy loam	SM, ML, SM-SC, CL-ML	A-4, A-2-4	0	80-100	80-100	65-100	40-75	<25	NP-5
	6-25	Clay, sandy clay, clay loam.	CL, SC, CH	A-6, A-7-6, A-7-5	0	100	100	85-100	45-95	36-66	14-34
	25-64	Sandy clay loam, sandy loam, fine sandy loam.	CL, SC, SM-SC, CL-ML	A-6, A-4, A-7-6	0	100	100	75-100	40-60	25-45	5-21

See footnote at end of table.

TABLE 17.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	3-10 inches	4	10	40	200		
	In				Pct					Pct	
Mm*:											
Mooreville	0-6	Loam	CL-ML, CL, SM-SC, SC	A-4	0	100	100	80-100	40-85	20-30	5-10
	6-52	Sandy clay loam, clay loam, loam.	CL, SC	A-6, A-7	0	100	100	80-95	45-80	28-50	15-30
	52-80	Loam, sandy clay loam, clay loam.	SC, CL	A-6, A-7	0	100	100	80-95	45-80	28-50	15-30
Mantachie	0-8	Loam	CL-ML, SM-SC, SM, ML	A-4	0-5	95-100	90-100	60-85	40-60	<20	NP-5
	8-80	Loam, clay loam, sandy clay loam.	CL, SC, SM-SC, CL-ML	A-4, A-6	0-5	95-100	90-100	80-95	45-80	20-40	5-15
Nu	0-6	Loam	ML, CL-ML	A-4	0	95-100	95-100	90-100	55-95	<25	NP-7
Nugent	6-80	Stratified loamy sand to fine sandy loam.	SM, SP-SM	A-2	0	85-100	75-100	60-100	10-30	<25	NP-3
PkC	0-7	Loamy fine sand	SM, SM-SC	A-2-4	0	100	95-100	85-100	15-30	<28	NP-7
Pickton	7-70	Loamy fine sand, fine sand.	SM, SM-SC	A-2-4	0	100	95-100	85-100	15-30	<28	NP-7
	70-96	Sandy clay loam, clay loam, fine sandy loam.	SC, CL, CL-ML, SM-SC	A-4, A-6, A-2-6, A-2-4	0	100	95-100	85-100	25-75	23-35	5-14
PkE	0-3	Loamy fine sand	SM, SM-SC	A-2-4	0	100	95-100	85-100	15-30	<28	NP-7
Pickton	3-50	Loamy fine sand, fine sand.	SM, SM-SC	A-2-4	0	100	95-100	85-100	15-30	<28	NP-7
	50-80	Sandy clay loam, clay loam, fine sandy loam.	SC, CL, CL-ML, SM-SC	A-4, A-6, A-2-6, A-2-4	0	100	95-100	85-100	25-75	23-35	5-14
PrB	0-10	Very fine sandy loam.	ML, CL-ML	A-4	0-5	98-100	95-100	70-90	50-65	<25	NP-7
Pirkey	10-48	Stratified fine sandy loam to clay.	CL	A-4, A-6, A-7	0-2	98-100	95-100	60-90	60-85	23-45	7-25
	48-80	Fine sandy loam, clay loam, sandy clay loam.	CL	A-4, A-6, A-7	0-5	98-100	95-100	75-98	70-90	25-46	7-25
PrC	0-6	Very fine sandy loam.	ML, CL-ML	A-4	0-5	98-100	95-100	70-90	50-65	<25	NP-7
Pirkey	6-65	Stratified fine sandy loam to clay.	CL	A-4, A-6, A-7	0-2	98-100	95-100	60-90	60-85	23-45	7-25
	65-80	Fine sandy loam, clay loam, sandy clay loam.	CL	A-4, A-6, A-7	0-5	98-100	95-100	75-98	70-90	25-46	7-25
PrE	0-8	Very fine sandy loam.	ML, CL-ML	A-4	0-5	98-100	95-100	70-90	50-65	<25	NP-7
Pirkey	8-54	Stratified fine sandy loam to clay.	CL	A-4, A-6, A-7	0-2	98-100	95-100	60-90	60-85	23-45	7-25
	54-80	Fine sandy loam, clay loam, sandy clay loam.	CL	A-4, A-6, A-7	0-5	98-100	95-100	75-98	70-90	25-46	7-25

See footnote at end of table.

TABLE 17.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
Pt*-------------- Pits and Dumps	0-80	Variable---------	---	---	---	---	---	---	---	---	---
SaC-------------- Sacul	0-6	Very fine sandy loam.	SM-SC, SC, CL-ML, CL	A-4	0	75-100	75-100	65-95	40-75	<30	4-10
	6-43	Clay, silty clay, clay loam.	CH, CL, SC	A-7	0	85-100	85-100	70-100	40-95	45-70	20-40
	43-70	Silty clay loam, clay loam, loam.	CL, SC	A-6, A-7, A-4, A-2	0	85-100	85-100	65-100	30-95	25-48	8-25
Sm*:											
Sardis----------	0-11	Loam------------	ML, CL-ML, CL	A-4	0	100	100	85-100	50-90	<30	NP-10
	11-80	Silt loam, silty clay loam, clay loam.	CL, CL-ML	A-4, A-6	0	100	100	90-100	70-95	25-40	5-20
Mathiston-------	0-8	Loam------------	CL, CL-ML	A-4, A-6	0	100	100	85-100	60-95	25-35	7-15
	8-80	Silty clay loam, loam, silt loam.	CL	A-6, A-7	0	100	100	85-100	70-90	30-45	15-25
SrA-------------- Sawyer	0-13	Very fine sandy loam.	ML, CL-ML	A-4	0	100	95-100	85-95	50-90	<25	NP-7
	13-31	Silty clay loam, loam, silt loam.	CL	A-6	0	100	95-100	85-95	60-95	30-40	10-20
	31-80	Silty clay, clay, silty clay loam.	CH, CL	A-7	0	100	95-100	90-100	75-95	45-60	20-35
SvA-------------- Scottsville	0-12	Very fine sandy loam.	SM-SC, SM, CL-ML, ML	A-4	0	99-100	98-100	45-78	45-78	<25	NP-6
	12-33	Loam, sandy clay loam, clay loam.	CL, CL-ML	A-4, A-6	0	98-100	95-100	90-100	60-85	25-40	6-20
	33-60	Clay, silty clay	CH	A-7-6	0	100	98-100	95-100	65-95	50-65	30-44
	60-80	Clay, clay loam, sandy clay loam.	CL, CH	A-6, A-7	0	100	98-100	95-100	57-92	32-65	15-42
Sz--------------- Socagee	0-7	Silty clay loam	CL	A-6, A-7	0	100	100	90-100	70-98	35-48	15-25
	7-40	Silt loam, silty clay loam, clay loam.	CL, CL-ML	A-4, A-6, A-7	0	100	100	85-100	68-98	25-48	6-25
	40-80	Loam, clay loam, silty clay loam.	CL, CL-ML	A-4, A-6, A-7	0	100	100	85-100	65-95	25-48	6-25
Ur*. Urban land											
WaE-------------- Warnock	0-19	Loamy fine sand	SM	A-2	0	95-100	85-100	50-85	13-30	<20	NP
	19-61	Loam, sandy clay loam, clay loam.	SC, SM-SC, CL, CL-ML	A-4, A-6	0	95-100	85-100	70-99	45-75	20-40	7-20
	61-80	Loam, sandy clay loam, clay loam.	SC, SM-SC, CL, CL-ML	A-4, A-6	0	95-100	85-100	60-99	36-75	15-40	4-20
WoC-------------- Wolfpen	0-4	Loamy fine sand	SM, SM-SC	A-2-4	0	95-100	95-100	85-100	15-35	<25	NP-7
	4-35	Loamy fine sand, fine sand.	SM, SM-SC	A-2-4	0	95-100	95-100	85-100	15-35	<25	NP-7
	35-50	Sandy clay loam, clay loam, loam.	SC, CL	A-6, A-4, A-2	0	95-100	95-100	85-100	26-55	25-40	8-20
	50-80	Sandy clay loam, clay loam, loam.	SC, SM, CL, ML	A-4, A-6, A-2, A-7	0	95-100	95-100	85-100	25-55	15-45	2-27

See footnote at end of table.

TABLE 17.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
WoE-------------- Wolfpen	0-4	Loamy fine sand	SM, SM-SC	A-2-4	0	95-100	95-100	85-100	15-35	<25	NP-7
	4-30	Loamy fine sand, fine sand.	SM, SM-SC	A-2-4	0	95-100	95-100	85-100	15-35	<25	NP-7
	30-61	Sandy clay loam, clay loam, loam.	SC, CL	A-6, A-4, A-2	0	95-100	95-100	85-100	26-55	25-40	8-20
	61-80	Sandy clay loam, clay loam, loam.	SC, SM, CL, ML	A-4, A-6, A-2, A-7	0	95-100	95-100	85-100	25-55	15-45	2-27

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 18.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

(The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated)

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH	mmhos/cm				Pct
BaB--------------	0-11	3-15	1.30-1.50	2.0-6.0	0.11-0.15	5.1-6.5	<2	Low---------	0.28	5	<2
Bernaldo	11-43	15-30	1.40-1.65	0.6-2.0	0.15-0.20	4.5-6.5	<2	Moderate----	0.32		
	43-80	10-30	1.45-1.70	0.6-2.0	0.15-0.20	4.5-6.5	<2	Low---------	0.32		
Bb---------------	0-8	2-18	1.20-1.55	0.6-2.0	0.15-0.20	4.5-5.5	<2	Low---------	0.28	5	<2
Bibb	8-64	2-18	1.30-1.60	0.6-2.0	0.12-0.20	4.5-5.5	<2	Low---------	0.37		
BeB--------------	0-50	5-15	1.35-1.60	2.0-6.0	0.08-0.11	4.5-6.5	<2	Low---------	0.20	5	<2
Bienville	50-80	5-20	1.35-1.70	2.0-6.0	0.08-0.13	4.5-6.0	<2	Low---------	0.20		
BnA*:											
Bonn------------	0-12	5-18	1.30-1.50	0.2-0.6	0.15-0.23	4.5-7.3	<2	Low---------	0.49	3	<2
	12-43	18-35	1.40-1.75	<0.06	0.08-0.14	5.6-9.0	<4	Low---------	0.49		
	43-80	15-35	1.40-1.75	<0.2	0.08-0.14	6.6-9.0	<4	Low---------	0.49		
Cart------------	0-3	2-14	1.40-1.65	2.0-6.0	0.13-0.17	4.5-6.5	<2	Low---------	0.55	5	<2
	3-20	2-14	1.40-1.65	2.0-6.0	0.11-0.17	4.5-6.0	<2	Low---------	0.55		
	20-57	10-18	1.50-1.90	0.6-2.0	0.11-0.17	4.5-6.0	<2	Low---------	0.43		
	57-62	15-26	1.60-1.90	0.06-0.2	0.05-0.11	4.5-5.5	<2	Low---------	0.37		
	62-80	27-39	1.50-1.85	0.2-0.6	0.14-0.18	4.5-5.5	<2	Moderate----	0.32		
BoC--------------	0-10	3-15	1.40-1.69	2.0-6.0	0.10-0.15	4.5-6.5	<2	Low---------	0.32	5	<1
Bowie	10-31	18-35	1.60-1.69	0.6-2.0	0.11-0.18	4.5-5.5	<2	Low---------	0.32		
	31-68	18-35	1.60-1.80	0.2-0.6	0.11-0.18	4.5-5.5	<2	Low---------	0.32		
	68-83	25-40	1.65-1.80	0.2-0.6	0.11-0.18	4.5-5.5	<2	Moderate----	0.32		
CbE--------------	0-6	2-15	1.20-1.40	2.0-6.0	0.11-0.15	4.5-6.5	<2	Low---------	0.37	3	<2
Cuthbert	6-26	35-60	1.24-1.45	0.2-0.6	0.10-0.15	3.6-5.5	<2	Moderate----	0.32		
	26-34	20-50	1.35-1.60	0.2-0.6	0.09-0.15	3.6-5.5	<2	Moderate----	0.32		
	34-60	20-45	1.40-1.65	0.06-0.6	0.08-0.15	3.6-5.0	<2	Moderate----	0.32		
CbE--------------	0-14	2-15	1.20-1.40	2.0-6.0	0.10-0.14	4.5-6.5	<2	Low---------	0.20	3	<2
Cuthbert	14-30	35-60	1.24-1.45	0.2-0.6	0.10-0.15	3.6-5.5	<2	Moderate----	0.32		
	30-36	20-50	1.35-1.60	0.2-0.6	0.09-0.15	3.6-5.5	<2	Moderate----	0.32		
	36-60	20-45	1.40-1.65	0.06-0.6	0.08-0.15	3.6-5.0	<2	Moderate----	0.32		
CbF--------------	0-9	2-15	1.20-1.40	2.0-6.0	0.10-0.14	4.5-6.5	<2	Low---------	0.20	3	<2
Cuthbert	9-29	35-60	1.24-1.45	0.2-0.6	0.10-0.15	3.6-5.5	<2	Moderate----	0.32		
	29-39	20-50	1.35-1.60	0.2-0.6	0.09-0.15	3.6-5.5	<2	Moderate----	0.32		
	39-60	20-45	1.40-1.65	0.06-0.6	0.08-0.15	3.6-5.0	<2	Moderate----	0.32		
Cy---------------	0-6	25-40	1.40-1.70	<0.06	0.15-0.20	3.6-5.0	<2	Moderate----	0.32	1	2-5
Cypress	6-60	35-60	1.10-1.50	<0.06	0.12-0.20	3.6-5.0	<2	Moderate----	0.32		
DbC--------------	0-33	5-15	1.25-1.70	2.0-6.0	0.07-0.12	4.5-6.5	<2	Low---------	0.28	4	.5-4
Darbonne	33-41	10-30	1.35-1.70	0.6-2.0	0.05-0.12	4.5-6.0	<2	Low---------	0.20		
	41-80	10-30	1.35-1.70	0.2-0.6	0.07-0.17	4.5-6.0	<2	Low---------	0.28		
Dcc--------------	0-3	3-15	1.50-1.65	6.0-20	0.07-0.11	4.5-6.5	<2	Low---------	0.17	5	<1
Darco	3-66	3-15	1.50-1.65	6.0-20	0.07-0.11	4.5-6.5	<2	Low---------	0.17		
	66-80	20-35	1.55-1.75	0.6-2.0	0.12-0.17	4.5-6.5	<2	Low---------	0.24		
	80-90	12-35	1.55-1.75	0.6-2.0	0.11-0.16	4.5-6.5	<2	Low---------	0.24		

See footnote at end of table.

TABLE 18.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH	mmhos/cm				Pct
DcE--------------	0-3	3-15	1.50-1.65	6.0-20	0.07-0.11	4.5-6.5	<2	Low---------	0.17	5	<1
Darco	3-69	3-15	1.50-1.65	6.0-20	0.07-0.11	4.5-6.5	<2	Low---------	0.17		
	69-77	20-35	1.55-1.75	0.6-2.0	0.12-0.17	4.5-6.5	<2	Low---------	0.24		
	77-90	12-35	1.55-1.75	0.6-2.0	0.11-0.16	4.5-6.5	<2	Low---------	0.24		
DrC--------------	0-19	2-10	1.20-1.60	6.0-20	0.05-0.09	4.5-7.3	<2	Low---------	0.15	5	<1
Darden	19-80	2-10	1.20-1.60	6.0-20	0.05-0.09	4.5-7.3	<2	Low---------	0.15		
DrE--------------	0-7	2-10	1.20-1.60	6.0-20	0.05-0.09	4.5-7.3	<2	Low---------	0.15	5	<1
Darden	7-80	2-10	1.20-1.60	6.0-20	0.05-0.09	4.5-7.3	<2	Low---------	0.15		
EaC--------------	0-8	3-18	1.20-1.60	0.6-2.0	0.13-0.20	4.5-6.0	<2	Low---------	0.55	4	<1
Eastwood	8-37	40-65	1.20-1.45	<0.06	0.12-0.18	3.6-5.5	<2	High--------	0.32		
	37-51	25-40	1.20-1.50	0.06-0.2	0.12-0.20	3.6-6.5	<2	High--------	0.32		
	51-72	15-35	1.35-1.65	0.06-0.2	0.10-0.15	4.5-7.3	<4	Moderate----	0.37		
EaE--------------	0-4	3-18	1.20-1.60	0.6-2.0	0.13-0.20	4.5-6.0	<2	Low---------	0.55	4	<1
Eastwood	4-24	40-65	1.20-1.45	<0.06	0.12-0.18	3.6-5.5	<2	High--------	0.32		
	24-46	25-40	1.20-1.50	0.06-0.2	0.12-0.20	3.6-6.5	<2	High--------	0.32		
	46-60	15-35	1.35-1.65	0.06-0.2	0.10-0.15	4.5-7.3	<4	Moderate----	0.37		
EbB--------------	0-11	2-15	1.25-1.40	2.0-6.0	0.10-0.15	5.1-7.3	<2	Low---------	0.28	5	<2
Elrose	11-19	15-31	1.30-1.55	0.6-2.0	0.13-0.16	4.5-7.3	<2	Low---------	0.32		
	19-80	27-55	1.35-1.65	0.6-2.0	0.12-0.18	4.5-6.5	<2	Moderate----	0.32		
EcA*:											
Erno------------	0-9	8-18	1.40-1.63	2.0-6.0	0.15-0.18	4.5-6.5	<2	Low---------	0.49	3	<1
	9-36	18-35	1.50-1.75	0.6-2.0	0.15-0.20	4.5-6.5	<2	Low---------	0.37		
	36-88	12-33	1.50-1.75	0.06-0.2	0.08-0.12	4.5-5.5	<2	Low---------	0.32		
Cart------------	0-3	2-14	1.40-1.65	2.0-6.0	0.13-0.17	4.5-6.5	<2	Low---------	0.55	5	<2
	3-22	2-14	1.40-1.65	2.0-6.0	0.11-0.17	4.5-6.0	<2	Low---------	0.55		
	22-43	10-18	1.50-1.90	0.6-2.0	0.11-0.17	4.5-6.0	<2	Low---------	0.43		
	43-80	15-26	1.60-1.90	0.06-0.2	0.05-0.11	4.5-5.5	<2	Low---------	0.37		
Es---------------	0-4	40-59	1.40-1.55	<0.06	0.13-0.17	3.6-6.0	<2	High--------	0.32	5	.5-5
Estes	4-65	40-60	1.50-1.65	<0.06	0.13-0.17	3.6-5.5	<4	High--------	0.32		
	65-80	25-40	1.45-1.65	0.06-0.2	0.15-0.20	3.6-6.0	<4	Moderate----	0.32		
GcA*:											
Guyton----------	0-17	7-25	1.35-1.65	0.6-2.0	0.20-0.23	3.6-6.0	<2	Low---------	0.43	5	.5-4
	17-58	20-35	1.35-1.70	0.06-0.2	0.15-0.22	3.6-6.5	<2	Low---------	0.37		
	58-80	20-35	1.35-1.70	0.06-0.2	0.15-0.22	3.6-8.4	<2	Low---------	0.37		
Cart------------	0-3	2-14	1.40-1.65	2.0-6.0	0.13-0.17	4.5-6.5	<2	Low---------	0.55	5	<2
	3-23	2-14	1.40-1.65	2.0-6.0	0.11-0.17	4.5-6.0	<2	Low---------	0.55		
	23-50	10-18	1.50-1.90	0.6-2.0	0.11-0.17	4.5-6.0	<2	Low---------	0.43		
	50-70	15-26	1.60-1.90	0.06-0.2	0.05-0.11	4.5-5.5	<2	Low---------	0.37		
	70-80	27-39	1.50-1.85	0.2-0.6	0.14-0.18	4.5-5.5	<2	Moderate----	0.32		
Iu---------------	0-4	6-15	---	2.0-6.0	0.10-0.15	5.1-6.0	<2	Low---------	0.24	5	<2
Iuka	4-45	8-18	---	0.6-2.0	0.10-0.20	4.5-5.5	<2	Low---------	0.28		
	45-80	5-15	---	0.6-2.0	0.10-0.20	4.5-5.5	<2	Low---------	0.20		
KfC--------------	0-14	2-15	1.20-1.40	2.0-6.0	0.11-0.16	5.1-7.3	<2	Low---------	0.37	4	<2
Kirvin	14-41	35-60	1.24-1.45	0.2-0.6	0.10-0.15	3.6-5.5	<2	Moderate----	0.32		
	41-50	25-50	1.35-1.60	0.2-0.6	0.10-0.16	3.6-5.0	<2	Moderate----	0.32		
	50-61	20-45	1.40-1.65	0.06-0.2	0.08-0.16	3.6-5.0	<2	Moderate----	0.32		

See footnote at end of table.

TABLE 18.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH	mmhos/cm				Pct
KgC-------------- Kirvin	0-8	2-15	1.20-1.40	2.0-6.0	0.08-0.12	5.1-7.3	<2	Low---------	0.20	4	<2
	8-32	35-60	1.24-1.45	0.2-0.6	0.10-0.15	3.6-5.5	<2	Moderate----	0.32		
	32-41	25-50	1.35-1.60	0.2-0.6	0.10-0.16	3.6-5.0	<2	Moderate----	0.32		
	41-61	20-45	1.40-1.65	0.06-0.2	0.08-0.16	3.6-5.0	<2	Moderate----	0.32		
KsC-------------- Kirvin	0-3	2-15	1.20-1.40	2.0-6.0	0.08-0.12	4.5-7.3	<2	Low---------	0.20	4	<1
	3-10	35-60	1.30-1.45	0.2-0.6	0.12-0.18	3.6-5.5	<2	Moderate----	0.32		
	10-28	25-50	1.30-1.50	0.2-0.6	0.12-0.17	3.6-5.0	<2	Moderate----	0.32		
	28-60	20-45	1.40-1.60	0.06-0.2	0.10-0.17	3.6-5.0	<2	Moderate----	0.32		
LaA*:											
Latch-----------	0-7	3-12	1.50-1.65	6.0-20.0	0.05-0.11	4.5-6.5	<2	Low---------	0.17	5	<1
	7-55	3-12	1.50-1.65	6.0-20.0	0.05-0.11	4.5-6.5	<2	Low---------	0.17		
	55-72	18-35	1.55-1.70	0.6-2.0	0.12-0.17	4.5-6.0	<2	Low---------	0.24		
	72-80	2-10	1.50-1.70	6.0-20.0	0.-0.11	5.1-6.5	<2	Low---------	0.17		
Mollville-------	0-8	10-20	1.40-1.65	0.2-0.6	0.15-0.20	4.5-6.0	<2	Low---------	0.37	5	<1
	8-36	22-35	1.50-1.69	0.06-0.2	0.12-0.17	4.5-6.0	<4	Moderate----	0.32		
	36-48	22-35	1.50-1.69	0.06-0.2	0.15-0.20	5.1-7.8	<4	Moderate----	0.32		
	48-62	5-35	1.50-1.65	0.6-2.0	0.07-0.11	5.1-7.8	<4	Low---------	0.32		
LeB-------------- Latex	0-10	2-18	1.28-1.45	2.0-6.0	0.11-0.18	4.5-6.0	<2	Low---------	0.37	5	<2
	10-33	18-35	1.28-1.45	0.6-2.0	0.12-0.20	4.5-5.5	<2	Moderate----	0.32		
	33-42	18-35	1.30-1.45	0.6-2.0	0.12-0.18	4.5-5.5	<2	Moderate----	0.32		
	42-75	35-55	1.30-1.65	0.06-0.2	0.12-0.18	4.5-5.0	<2	High--------	0.32		
	75-80	15-35	1.28-1.69	0.2-0.6	0.11-0.16	3.6-5.0	<2	Moderate----	0.37		
LtC-------------- Lilbert	0-9	3-15	1.50-1.60	6.0-20	0.07-0.12	4.5-6.0	<2	Low---------	0.20	5	<2
	9-23	3-15	1.50-1.65	6.0-20	0.07-0.11	4.5-6.0	<2	Low---------	0.20		
	23-43	16-35	1.55-1.69	0.6-2.0	0.13-0.17	4.5-6.0	<2	Low---------	0.24		
	43-80	16-35	1.60-1.75	0.2-0.6	0.10-0.15	3.6-5.5	<2	Low---------	0.24		
MaG-------------- Maben	0-3	15-25	1.40-1.50	0.6-2.0	0.15-0.20	5.6-6.5	<2	Low---------	0.37	3	<1
	3-18	35-55	1.45-1.55	0.2-0.6	0.14-0.18	4.5-6.0	<2	High--------	0.28		
	18-32	---	---	0.2-0.6	0.14-0.18	4.5-6.0	<2	Moderate----	0.28		
	32-60	---	---	0.2-0.6	0.10-0.15	4.5-6.0	<2	Low---------	----		
MbB-------------- Marklake	0-6	10-20	1.35-1.65	0.06-0.2	0.12-0.17	4.5-5.5	<2	Low---------	0.37	5	<2
	6-60	15-35	1.35-1.70	0.06-0.2	0.14-0.17	4.5-5.5	<2	Moderate----	0.37		
MbC-------------- Marklake	0-8	10-20	1.35-1.65	0.06-0.2	0.12-0.17	4.5-5.5	<2	Low---------	0.37	5	<2
	8-60	15-35	1.35-1.70	0.06-0.2	0.14-0.17	4.5-5.5	<2	Moderate----	0.37		
MbE-------------- Marklake	0-3	20-35	1.35-1.65	0.06-0.2	0.14-0.17	4.5-5.5	<2	Moderate----	0.37	5	<2
	3-60	15-35	1.35-1.70	0.06-0.2	0.14-0.17	4.5-5.5	<2	Moderate----	0.37		
McA*:											
Metcalf---------	0-10	7-22	1.35-1.65	0.6-2.0	0.12-0.18	4.5-6.0	<2	Low---------	0.49	5	<2
	10-29	18-27	1.35-1.65	0.2-0.6	0.15-0.20	4.5-6.0	<2	Low---------	0.37		
	29-73	40-60	1.20-1.60	<0.06	0.15-0.18	4.5-6.0	<2	High--------	0.32		
Cart------------	0-4	2-14	1.40-1.65	2.0-6.0	0.13-0.17	4.5-6.5	<2	Low---------	0.55	5	<2
	4-28	2-14	1.40-1.65	2.0-6.0	0.11-0.17	4.5-6.0	<2	Low---------	0.55		
	28-50	10-18	1.50-1.90	0.6-2.0	0.11-0.17	4.5-6.0	<2	Low---------	0.43		
	50-77	15-26	1.60-1.90	0.06-0.2	0.05-0.11	4.5-5.5	<2	Low---------	0.37		
	77-80	27-39	1.50-1.85	0.2-0.6	0.14-0.18	4.5-5.5	<2	Moderate----	0.32		
MeB-------------- Meth	0-6	5-20	1.30-1.60	0.6-2.0	0.12-0.18	5.1-6.5	<2	Low---------	0.32	5	<2
	6-25	35-55	1.20-1.65	0.2-0.6	0.15-0.18	4.5-6.0	<2	Moderate----	0.28		
	25-64	10-35	1.30-1.70	0.6-2.0	0.12-0.18	4.5-6.0	<2	Low---------	0.32		

See footnote at end of table.

TABLE 18.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH	mmhos/cm				Pct
Mm*:											
Mooreville------	0-6	5-27	1.40-1.50	0.6-2.0	0.14-0.20	4.5-5.5	<2	Low---------	0.37	5	<2
	6-52	18-35	1.40-1.50	0.6-2.0	0.14-0.18	4.5-5.5	<2	Moderate----	0.28		
	52-80	10-40	1.40-1.60	0.6-2.0	0.14-0.18	4.5-5.5	<2	Moderate----	0.28		
Mantachie-------	0-8	8-20	1.50-1.60	0.6-2.0	0.16-0.20	4.5-5.5	<2	Low---------	0.28	5	1-3
	8-80	18-34	1.50-1.60	0.6-2.0	0.14-0.20	4.5-5.5	<2	Low---------	0.28		
Nu-------------- Nugent	0-6	5-20	1.40-1.50	2.0-6.0	0.16-0.20	4.5-6.5	<2	Low---------	0.37	5	<2
	6-80	2-10	1.20-1.40	2.0-6.0	0.07-0.13	4.5-6.5	<2	Low---------	0.17		
PkC------------- Pickton	0-7	4-12	1.30-1.60	6.0-20	0.07-0.11	5.6-7.3	<2	Low---------	0.17	5	<2
	7-70	3-12	1.30-1.60	6.0-20	0.07-0.11	5.1-7.3	<2	Low---------	0.17		
	70-96	18-30	1.30-1.65	0.6-2.0	0.12-0.17	4.5-6.5	<2	Low---------	0.24		
PkE------------- Pickton	0-3	4-12	1.30-1.60	6.0-20	0.07-0.11	5.6-7.3	<2	Low---------	0.17	5	<2
	3-50	3-12	1.30-1.60	6.0-20	0.07-0.11	5.1-7.3	<2	Low---------	0.17		
	50-80	18-30	1.30-1.65	0.6-2.0	0.12-0.17	4.5-6.5	<2	Low---------	0.24		
PrB------------- Pirkey	0-10	3-15	1.30-1.60	0.6-2.0	0.12-0.18	4.5-6.5	<2	Low---------	0.37	4	<1
	10-48	18-40	1.50-1.80	0.06-0.6	0.12-0.18	4.5-5.5	<2	Moderate----	0.28		
	48-80	15-50	1.40-1.70	0.06-0.2	0.15-0.20	3.6-5.0	<2	Moderate----	0.28		
PrC------------- Pirkey	0-6	3-15	1.30-1.60	0.6-2.0	0.12-0.18	4.5-6.5	<2	Low---------	0.37	4	<1
	6-65	18-40	1.50-1.80	0.06-0.6	0.12-0.18	4.5-5.5	<2	Moderate----	0.28		
	65-80	15-50	1.40-1.70	0.06-0.2	0.15-0.20	3.6-5.0	<2	Moderate----	0.28		
PrE------------- Pirkey	0-8	3-15	1.30-1.60	0.6-2.0	0.12-0.18	4.5-6.5	<2	Low---------	0.37	4	<1
	8-54	18-40	1.50-1.80	0.06-0.6	0.12-0.18	4.5-5.5	<2	Moderate----	0.28		
	54-80	15-50	1.40-1.70	0.06-0.2	0.15-0.20	3.6-5.0	<2	Moderate----	0.28		
Pt*------------- Pits and Dumps	0-80	---	---	---	0.01-0.10	4.5-5.5	<2	Low---------	0.10	1	---
SaC------------- Sacul	0-6	10-25	1.30-1.50	0.6-2.0	0.13-0.17	4.5-6.0	<2	Low---------	0.32	5	1-3
	6-43	35-60	1.25-1.40	0.06-0.2	0.15-0.18	3.6-5.5	<2	High--------	0.32		
	43-70	15-40	1.30-1.45	0.2-0.6	0.14-0.18	3.6-5.5	<2	Low---------	0.28		
Sm*:											
Sardis----------	0-11	10-25	1.25-1.60	0.6-2.0	0.15-0.24	4.5-6.0	<2	Low---------	0.37	5	1-3
	11-80	14-35	1.25-1.60	0.6-2.0	0.15-0.24	4.5-6.0	<2	Low---------	0.37		
Mathiston-------	0-8	5-25	1.40-1.50	0.6-2.0	0.18-0.22	4.5-5.5	<2	Low---------	0.37	5	1-3
	8-80	20-35	1.45-1.55	0.6-2.0	0.18-0.22	4.5-5.5	<2	Low---------	0.37		
SrA------------- Sawyer	0-13	15-25	1.45-1.60	0.6-2.0	0.15-0.24	4.5-5.5	<2	Low---------	0.37	5	1-3
	13-31	20-40	1.45-1.60	0.2-0.6	0.15-0.24	4.5-5.5	<2	Moderate----	0.32		
	31-80	30-60	1.15-1.50	0.06-0.2	0.12-0.18	4.5-5.5	<2	High--------	0.32		
SvA------------- Scottsville	0-12	2-12	1.20-1.55	2.0-6.0	0.11-0.20	4.5-6.0	<2	Low---------	0.43	5	.5-2
	12-33	10-35	1.30-1.55	0.6-2.0	0.10-0.20	4.5-5.5	<2	Moderate----	0.32		
	33-60	40-60	1.35-1.55	<0.06	0.12-0.18	4.5-5.5	<2	High--------	0.32		
	60-80	20-50	1.34-1.60	<0.06	0.12-0.22	4.5-6.0	<2	High--------	0.32		
Sz-------------- Socagee	0-7	27-40	1.35-1.65	0.6-2.0	0.15-0.20	4.5-5.0	<2	Moderate----	0.32	5	1-3
	7-40	20-40	1.35-1.65	0.2-0.6	0.15-0.20	3.6-5.0	<2	Moderate----	0.32		
	40-80	18-40	1.35-1.65	0.2-0.6	0.14-0.20	4.5-7.3	<2	Moderate----	0.32		
Ur*. Urban land											

See footnote at end of table.

TABLE 18.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH	mmhos/cm				Pct
WaE-------------- Warnock	0-19	1-10	1.40-1.50	2.0-6.0	0.06-0.10	3.6-5.5	<2	Low----------	0.17	5	<2
	19-61	15-35	1.40-1.55	0.6-2.0	0.12-0.17	3.6-5.5	<2	Low----------	0.24		
	61-80	12-40	1.40-1.55	0.6-2.0	0.10-0.17	3.6-5.5	<2	Low----------	0.24		
WoC-------------- Wolfpen	0-4	3-12	1.30-1.60	6.0-20.0	0.07-0.11	4.5-6.5	<2	Low----------	0.17	5	<2
	4-35	3-12	1.30-1.65	6.0-20	0.07-0.11	4.5-6.5	<2	Low----------	0.17		
	35-50	18-30	1.30-1.65	0.6-2.0	0.12-0.17	4.5-6.5	<2	Low----------	0.24		
	50-80	15-35	1.30-1.65	0.6-2.0	0.12-0.17	4.5-6.5	<2	Low----------	0.24		
WoE-------------- Wolfpen	0-4	3-12	1.30-1.60	6.0-20.0	0.07-0.11	4.5-6.5	<2	Low----------	0.17	5	<2
	4-30	3-12	1.30-1.65	6.0-20	0.07-0.11	4.5-6.5	<2	Low----------	0.17		
	30-61	18-30	1.30-1.65	0.6-2.0	0.12-0.17	4.5-6.5	<2	Low----------	0.24		
	61-80	15-35	1.30-1.65	0.6-2.0	0.12-0.17	4.5-6.5	<2	Low----------	0.24		

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 19.--SOIL AND WATER FEATURES

("Flooding" and "water table" and terms such as "frequent," "brief," "apparent," and "perched" are explained in the text. The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated)

Soil name and map symbol	Hydro-logic group	Flooding			High water table			Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Uncoated steel	Concrete
					Ft				
BaB---------------- Bernaldo	B	None---------	---	---	4.0-6.0	Perched	Nov-Feb	Moderate	Moderate.
Bb---------------- Bibb	D	Frequent----	Brief to long.	Dec-May	0.5-1.5	Apparent	Dec-Apr	High-----	Moderate.
BeB---------------- Bienville	A	None---------	---	---	4.0-6.0	Apparent	Dec-Apr	Low------	High.
BnA*:									
Bonn--------------	D	Occasional	Brief-----	Nov-Jun	0-2.0	Perched	Dec-Apr	High-----	Low.
Cart--------------	B	None---------	---	---	3.0-4.0	Perched	Nov-May	Moderate	Moderate.
BoC---------------- Bowie	B	None---------	---	---	3.5-5.0	Perched	Jan-Apr	Moderate	High.
CbE, CgE, CgF----- Cuthbert	C	None---------	---	---	>6.0	---	---	High-----	High.
Cy----------------- Cypress	D	Frequent----	Very long	Jan-Dec	+4-1.0	Apparent	Jan-Dec	Moderate	High.
DbC---------------- Darbonne	B	None---------	---	---	>6.0	---	---	Low------	Moderate.
DcC, DcE---------- Darco	A	None---------	---	---	>6.0	---	---	Low------	Moderate.
DrC, DrE---------- Darden	A	None---------	---	---	>6.0	---	---	Low------	High.
EaC, EaE---------- Eastwood	D	None---------	---	---	>6.0	---	---	High-----	High.
EbB---------------- Elrose	B	None---------	---	---	>6.0	---	---	Moderate	Moderate.
EcA*:									
Erno--------------	B	None---------	---	---	2.5-4.0	Perched	Nov-May	Moderate	Moderate.
Cart--------------	B	None---------	---	---	3.0-4.0	Perched	Nov-May	Moderate	Moderate.
Es----------------- Estes	D	Occasional	Brief to long.	Nov-May	+.5-2.0	Perched	Nov-May	High-----	High.
GcA*:									
Guyton------------	D	Occasional	Very brief to long.	Jan-Dec	0-1.5	Perched	Dec-May	High-----	High.
Cart--------------	B	None---------	---	---	3.0-4.0	Perched	Nov-May	Moderate	Moderate.
Iu----------------- Iuka	C	Frequent----	Very brief to brief.	Dec-Apr	1.0-3.0	Apparent	Dec-Apr	Moderate	High.

See footnote at end of table.

TABLE 19.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro-logic group	Flooding: Frequency	Flooding: Duration	Flooding: Months	High water table: Depth	High water table: Kind	High water table: Months	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete
					Ft				
KfC, KgC: Kirvin	C	None	---	---	>6.0	---	---	High	High.
KsC: Kirvin	D	None	---	---	>6.0	---	---	High	High.
LaA*:									
Latch	A	None	---	---	2.5-4.0	Perched	Jan-Apr	Moderate	High.
Mollville	D	None	---	---	+.5-1.0	Perched	Nov-Jun	High	High.
LeB: Latex	C	None	---	---	3.0-4.5	Perched	Dec-Apr	Moderate	High.
LtC: Lilbert	B	None	---	---	3.0-6.0	Perched	Jan-May	Moderate	High.
MaG: Maben	C	None	---	---	>6.0	---	---	High	Moderate.
MbB, MbC, MbE: Marklake	C	None	---	---	>6.0	---	---	High	High.
McA*:									
Metcalf	D	None	---	---	1.5-2.5	Perched	Dec-Apr	High	Moderate.
Cart	B	None	---	---	3.0-4.0	Perched	Nov-May	Moderate	Moderate.
MeB: Meth	C	None	---	---	>6.0	---	---	High	Moderate.
Mm*:									
Mooreville	C	Frequent	Brief to long.	Jan-Mar	1.5-3.0	Apparent	Jan-Mar	Moderate	High.
Mantachie	C	Frequent	Brief	Jan-Mar	1.0-1.5	Apparent	Dec-Mar	High	High.
Nu: Nugent	A	Frequent	Brief to long.	Dec-Apr	3.5-6.0	Apparent	Jan-Apr	Low	Moderate.
PkC, PkE: Pickton	A	None	---	---	4.0-6.0	Perched	Jan-Apr	Moderate	High.
PrB, PrC, PrE: Pirkey	C	None	---	---	>6.0	---	---	High	High.
Pt*: Pits and Dumps	D	None	---	---	>6.0	---	---	High	Low.
SaC: Sacul	C	None	---	---	2.0-4.0	Perched	Dec-Apr	High	High.
Sm*:									
Sardis	C	Frequent	Very brief	Dec-May	1.5-3.0	Apparent	Jan-May	High	Moderate.
Mathiston	C	Frequent	Very brief to long.	Jan-Apr	1.5-2.5	Apparent	Jan-Apr	High	High.
SrA: Sawyer	C	None	---	---	2.0-3.0	Perched	Dec-Apr	High	High.

See footnote at end of table.

TABLE 19.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro-logic group	Flooding			High water table			Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Uncoated steel	Concrete
					Ft				
SvA---------------- Scottsville	C	None---------	---	---	1.0-3.0	Perched	Nov-May	High-----	Moderate.
Sz----------------- Socagee	D	Frequent----	Very brief to brief.	Jan-May	0-1.5	Perched	Dec-May	High-----	Moderate.
Ur*---------------- Urban land	D	None---------	---	---	---	---	---	---	---
WaE---------------- Warnock	B	None---------	---	---	4.0-6.0	Perched	Jan-Mar	Moderate	High.
WoC, WoE----------- Wolfpen	A	None---------	---	---	4.0-6.0	Perched	Dec-May	Moderate	High.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 20.--CHEMICAL ANALYSES OF SELECTED SOILS

(Dashes indicate that data were not available. TR indicates a trace amount. CEC means cation-exchange capacity, ECEC means effective cation-exchange capacity, and ESP means exchangable sodium percentage)

Soil name and sample number	Depth	Horizon	Extractable bases: Ca	Extractable bases: Mg	Extractable bases: K	Extractable bases: Na	CEC	Base saturation	pH H_2O (1:1)	Organic carbon	KCL extractable Aluminum	ECEC	Aluminum saturation	ESP
			Meq/100g					Pct		Pct	Meq/100g		Pct	Pct
Bernaldo 1/ 2/	0-3	A	5.2	0.8	0.1	---	4.6	100.0	6.4	1.1	0.1	6.2	2.0	---
S84TX-203-004	3-11	E	1.3	0.5	0.1	---	2.2	86.0	5.8	0.3	0.1	2.0	5.0	---
	11-17	Bt1	3.1	1.0	0.1	---	4.7	89.0	5.7	0.2	---	4.2	---	---
	17-26	Bt2	4.9	1.7	0.1	0.1	7.0	97.0	5.9	0.2	---	6.8	---	1.0
	26-43	Bt3	2.6	2.6	0.1	0.1	6.4	86.0	5.2	0.1	0.7	6.2	11.0	2.0
	43-62	Bt/E1	0.6	1.9	---	0.1	6.8	39.0	5.1	0.1	1.9	4.5	28.0	2.0
	62-80	Bt/E2	0.7	1.6	---	0.1	7.0	35.0	4.7	0.1	3.6	6.1	51.0	1.0
	80-95	B't	0.3	1.6	0.1	0.1	---	----	4.7	0.1	7.0	9.1	77.0	---
Bowie 2/ 3/	0-5	Ap	1.1	0.3	0.1	TR	2.2	68.0	4.6	0.7	0.2	---	12.0	---
S83TX-203-001	5-10	E	1.0	0.4	0.1	TR	2.4	62.0	5.1	0.2	0.2	---	12.0	---
	10-23	Bt1	2.5	2.8	0.1	TR	8.4	64.0	5.4	0.2	0.4	---	7.0	---
	23-31	Bt2	0.8	2.5	0.1	TR	8.6	40.0	5.0	0.2	1.7	---	33.0	---
	31-46	Btv	0.4	1.8	0.1	TR	7.1	32.0	5.0	0.1	1.8	---	44.0	---
	46-57	Btv/E1	0.2	1.2	TR	TR	6.1	23.0	4.9	0.1	2.1	---	60.0	---
	57-68	Btv/E2	0.1	1.0	TR	TR	6.6	17.0	4.8	0.1	3.0	---	73.0	---
	68-83	B't	0.1	1.1	0.1	TR	8.9	15.0	4.7	0.1	5.0	---	79.0	---
	83-106	BC	0.1	1.1	0.1	TR	10.4	12.0	4.6	0.1	6.1	---	82.0	---
Eastwood 1/ 4/	7-25	Bt1	1.7	4.1	0.2	0.2	14.1	44.0	4.6	0.4	4.9	11.1	44.0	---
S84TX203-005	25-33	Bt2	1.2	8.2	0.3	0.7	24.9	42.0	4.8	0.4	10.1	20.5	49.0	---
Eastwood 1/ 5/	7-23	Bt1	1.4	7.1	0.4	0.1	33.2	27.0	4.5	0.6	15.0	24.0	63.0	---
S84TX-203-006	23-36	Bt2	0.4	6.2	0.3	0.2	29.5	24.0	4.5	0.4	15.5	22.6	69.0	---
Eastwood 1/ 6/	6-14	Bt1	3.3	4.1	0.3	0.3	27.8	29.0	4.9	0.7	15.3	23.3	66.0	---
S84TX203-007	14-33	Bt2	5.4	6.8	0.4	0.6	29.3	45.0	4.4	0.4	11.3	24.5	24.5	---
	50-54	BC	11.9	8.7	0.3	0.9	35.2	62.0	---	---	---	---	---	3.0
Eastwood 1/ 7/	5-16	Bt1	2.2	7.3	0.5	0.1	21.5	47.0	4.8	0.7	8.0	18.1	44.0	---
S84TX203-008	16-32	Bt2	0.9	4.8	0.4	0.1	17.4	36.0	4.7	0.3	8.3	14.5	57.0	---
Eastwood 1/ 8/	4-8	Bt1	3.1	5.6	0.4	---	25.7	35.0	4.8	0.8	4.2	13.3	32.0	---
S84TX203-009	8-17	Bt2	1.3	5.1	0.3	0.1	22.5	30.0	4.6	0.4	9.8	16.6	59.0	---
	55-59	BC	1.2	8.3	10.1	0.3	28.1	36.0	---	---	---	---	---	1.0
Eastwood 1/ 9/	2-10	Bt1	0.6	7.6	0.6	0.1	29.5	30.0	4.5	0.8	11.7	20.6	57.0	---
S84TX203-010	10-18	Bt2	0.8	7.9	0.5	0.3	26.8	35.0	4.6	0.4	13.1	22.6	58.0	---
	44-48	BC	0.7	7.7	0.3	0.6	19.4	48.0	---	---	---	---	---	3.0

See footnotes at end of table.

TABLE 20.--CHEMICAL ANALYSES OF SELECTED SOILS--Continued

Soil name and sample number	Depth	Horizon	Extractable bases: Ca	Extractable bases: Mg	Extractable bases: K	Extractable bases: Na	CEC	Base saturation	pH H_2O (1:1)	Organic carbon	KCL extractable Aluminum	ECEC	Aluminum saturation	ESP
			Meq/100g					Pct		Pct	Meq/100g		Pct	Pct
Eastwood 1/ 10/	0-3	A	5.4	2.2	0.3	---	16.6	48.0	4.9	3.7	1.2	9.2	13.0	---
S85TX203-002	3-8	EB	1.6	3.2	0.3	0.1	15.0	35.0	4.6	0.9	5.4	10.6	51.0	1.0
	8-12	Bt1	2.7	9.5	0.4	0.3	34.7	37.0	4.6	0.6	12.2	25.2	48.0	1.0
	12-17	Bt2	3.7	12.2	0.5	1.0	40.2	43.0	4.5	0.4	12.2	29.6	41.0	2.0
	17-23	Bt3	5.0	14.3	0.5	1.2	40.1	52.0	4.6	0.3	11.7	32.8	36.0	3.0
	23-28	Bt4	6.2	16.6	0.5	1.9	40.8	62.0	4.7	0.3	8.2	33.5	25.0	5.0
	28-37	Bt5	7.4	17.3	0.5	2.4	41.0	68.0	4.6	0.3	5.6	33.4	17.0	6.0
	37-46	Bt6	8.4	17.4	0.5	2.5	37.3	77.0	4.7	0.2	3.4	32.2	11.0	6.0
	46-51	BC	8.1	15.2	0.3	2.5	31.1	84.0	4.9	0.1	1.2	27.2	4.0	7.0
	51-72	C	12.2	18.5	0.4	3.9	36.1	97.0	6.9	0.1	---	---	---	8.0
Elrose 1/ 2/	0-5	Ap	2.7	0.2	0.1	---	3.5	86.0	6.5	0.8	---	---	---	---
S85TX203-001	5-11	E	1.7	0.1	0.1	---	2.5	76.0	6.8	0.3	---	---	---	---
	11-19	Bt1	3.7	0.7	0.3	---	5.1	94.0	6.7	0.2	---	---	---	---
	19-28	Bt2	5.0	1.6	0.3	---	8.2	85.0	6.3	0.2	---	---	---	---
	28-36	Bt3	4.1	1.5	0.2	---	7.0	83.0	5.6	0.1	---	---	---	---
	36-44	Bt4	4.3	2.1	0.2	---	7.8	86.0	5.6	0.2	---	---	---	---
	44-55	Bt5	5.3	3.7	0.3	---	11.1	83.0	5.7	0.1	---	---	---	---
	55-69	Bt6	4.6	4.3	0.4	---	10.9	86.0	5.7	0.1	---	---	---	---
	69-85	Bt7	3.6	5.8	0.4	---	11.8	83.0	5.5	0.1	---	9.8	---	---
	85-105	2BC	3.1	7.2	0.5	0.1	18.0	61.0	4.9	0.1	3.5	14.4	24.0	1.0
Erno 1/ 2/	0-4	Ap	0.1	---	0.4	---	4.1	12.0	4.0	1.5	1.4	1.9	---	---
S85TX203-003	4-9	E	0.2	---	0.1	---	2.7	11.0	4.4	0.4	0.9	1.2	---	---
	9-15	Bt1	3.1	0.8	0.2	---	4.3	95.0	5.1	0.3	0.4	4.5	---	---
	15-26	Bt2	5.1	2.5	0.1	---	8.1	95.0	5.9	0.2	0.2	7.9	---	---
	26-36	Bt3	2.6	1.3	0.1	---	5.7	71.0	5.3	0.2	0.7	4.8	---	---
	36-50	Btx	1.9	1.0	0.1	---	4.8	64.0	5.2	0.1	0.6	3.6	17.0	---
	50-68	Btx/E1	1.5	1.5	0.1	---	4.8	66.0	5.3	0.1	0.6	3.7	16.0	---
	68-75	Btx/E2	1.0	1.1	---	---	4.1	51.0	5.2	0.1	0.9	3.0	30.0	---
	75-88	Btx/E3	0.3	0.8	---	---	3.1	35.0	5.0	0.1	1.4	2.5	56.0	---
Estes 3/ 11/	14-36	Bg1	4.2	3.7	0.4	0.2	19.4	44.0	4.7	0.3	7.0	15.5	45.0	---
S82TX203-001														
Latex 1/ 12/	0-3	A	1.2	0.7	---	---	5.2	37.0	4.2	1.7	0.6	2.5	24.0	---
S84TX203-003	3-6	E	1.0	0.7	---	---	1.9	89.0	4.8	0.3	0.1	1.8	6.0	---
	6-12	BE	1.0	0.7	---	0.1	2.7	67.0	4.5	0.3	0.7	2.5	3.0	4.0
	12-26	Bt1	1.4	1.6	---	0.1	9.5	33.0	4.4	0.3	4.4	7.5	59.0	1.0
	26-38	Bt2	0.9	1.4	---	0.1	9.4	26.0	4.9	0.2	4.7	7.1	66.0	1.0
	38-43	2Bt/E1	0.8	1.7	0.1	0.1	13.0	21.0	4.9	0.2	7.8	10.5	74.0	1.0
	43-47	2Bt/E2	0.7	2.6	0.1	0.2	16.6	22.0	4.9	0.2	9.3	12.8	73.0	1.0
	47-63	2Btg1	1.7	5.3	0.1	0.4	25.3	30.0	5.0	0.2	13.8	21.3	65.0	2.0
	63-80	2Btg2	2.4	7.1	0.1	0.6	27.0	38.0	4.9	0.2	14.2	24.5	58.0	2.0
	80-92	2BCg	3.9	9.6	0.1	0.9	27.1	54.0	4.7	0.1	11.5	26.1	44.0	3.0

See footnotes at end of table.

TABLE 20.--CHEMICAL ANALYSES OF SELECTED SOILS--Continued

Soil name and sample number	Depth	Horizon	Extractable bases Ca	Extractable bases Mg	Extractable bases K	Extractable bases Na	CEC	Base saturation	pH H_2O (1:1)	Organic carbon	KCL extractable Aluminum	ECEC	Aluminum saturation	ESP
			Meq/100g					Pct		Pct	Meq/100g		Pct	Pct
Sacul 1/ 13/	0-4	A	2.0	0.4	0.3	0.1	5.9	48.0	5.5	1.3	1.1	3.9	---	2.0
S87TX203-002	4-7	E	1.3	0.2	0.1	0.1	4.3	40.0	5.5	0.5	1.6	3.3	---	2.0
	7-15	Bt1	4.2	7.3	0.4	0.2	23.2	53.0	4.5	0.8	8.7	20.9	---	1.0
	15-23	Bt2	0.9	4.6	0.3	0.1	22.8	26.0	4.3	0.4	10.7	16.6	---	---
	23-32	Bt3	0.1	3.7	0.3	0.2	23.0	19.0	4.3	0.3	13.9	18.2	---	1.0
	32-40	Bt4	---	3.5	0.3	0.2	24.4	16.0	4.3	0.3	16.6	20.6	---	1.0
	40-47	Bt5	---	3.3	0.3	0.2	23.9	16.0	4.3	0.4	17.5	21.3	---	1.0
	47-53	Bt6	---	2.7	0.3	0.1	22.2	14.0	4.3	0.2	15.6	18.8	---	---
	53-61	CB	---	1.5	0.2	0.1	16.9	11.0	4.4	0.3	11.3	13.1	---	1.0
	61-80	C	0.4	1.7	0.3	0.1	21.3	12.0	4.1	0.2	15.8	18.3	---	1.0
Scottsville 1/ 14/	0-4	A	3.9	1.2	0.1	0.3	10.0	55.0	4.9	2.7	0.2	5.7	4.0	2.0
S84TX203-001	4-8	E	2.0	0.5	0.1	0.1	3.6	75.0	5.3	0.8	0.3	3.0	10.0	3.0
	8-13	Bt1	1.2	0.7	---	0.1	5.6	36.0	4.8	0.3	1.8	3.8	47.0	2.0
	13-18	Bt/E1	1.1	1.3	---	0.2	8.6	31.0	4.5	0.3	4.0	6.6	61.0	2.0
	18-21	Bt/E2	1.4	1.9	0.1	0.3	13.0	29.0	4.7	0.4	5.7	9.5	60.0	2.0
	21-32	2Btg1	1.3	5.8	0.1	1.2	28.5	29.0	4.6	0.2	13.0	21.4	61.0	4.0
	32-41	2Btg2	3.0	8.0	0.1	1.6	19.9	64.0	4.8	0.1	9.2	21.9	42.0	8.0
	41-51	2Btg3	3.9	7.5	0.1	1.6	16.9	77.0	4.9	0.1	5.6	18.6	30.0	9.0
	51-66	2BC	3.5	4.3	---	1.2	9.4	96.0	5.4	0.1	1.2	10.2	12.0	13.0
	66-84	2BCg	6.6	11.5	0.1	3.3	19.7	100.0	5.1	0.1	0.5	22.0	3.0	17.0
Scottsville 1/ 2/	0-4	Ap	3.6	0.6	0.1	0.2	3.3	100.0	5.3	1.0	0.1	4.6	2.0	6.0
S84TX203-002	4-12	E	3.9	0.7	0.1	0.1	2.7	100.0	5.5	0.2	0.1	4.9	2.0	4.0
	12-19	Bt	2.4	1.2	0.1	0.1	3.7	100.0	5.2	0.2	0.5	4.3	12.0	3.0
	19-30	Bt/E1	1.7	2.0	---	0.1	7.5	51.0	4.9	0.2	2.5	6.4	39.0	1.0
	30-33	Bt/E2	2.3	3.3	0.1	0.3	10.5	56.0	4.8	0.2	4.9	10.8	45.0	3.0
	33-48	2Btg1	4.8	9.4	0.1	0.8	26.1	58.0	4.8	0.2	9.8	25.0	39.0	3.0
	48-60	2Btg2	5.9	12.5	0.1	1.3	25.7	77.0	4.9	0.2	6.6	26.4	25.0	5.0
	60-70	2BCtg1	9.4	16.9	0.1	2.2	32.4	88.0	4.8	0.1	6.1	34.8	18.0	7.0
	70-80	2BCtg2	10.5	18.3	0.1	2.7	36.1	87.0	4.7	---	4.4	35.9	12.0	7.0
	80-94	2C	9.4	14.4	0.1	2.4	28.9	91.0	4.7	0.1	2.3	28.7	8.0	8.0

See footnotes on next page.

1/ Analysis by Soil Characterization Laboratory, Texas A&M University, College Station, Texas.

2/ Location of the pedon sampled is the same as that of the pedon described as typical of series in the section "Soil Series and Their Morphology."

3/ Analysis by Soil Survey Laboratory, Soil Conservation Service, Lincoln, Nebraska.

4/ Location of the pedon: From the intersection of U.S. Highways 59 and 80 in Marshall, 0.5 mile south on U.S. Highway 59, 11.5 miles southeast on Texas Highway 31, and 400 feet west of a fence in an area of woodland.

5/ Location of the pedon: From the intersection of U.S. Highways 59 and 80 in Marshall, 0.5 mile south on U.S. Highway 59, about 8.95 miles southeast on Texas Highway 31, about 12.2 miles east on Farm Road 2625, about 0.65 mile north on a county road, 0.5 mile west on a private road, and 70 feet west in an area of woodland.

6/ Location of the pedon: From the intersection of U.S. Highways 59 and 80 in Marshall, 11.2 miles east on U.S. Highway 80, about 0.1 mile south and 1.75 miles east on a service road, 2.0 miles south on a county road, and 50 feet east in an area of woodland.

7/ Location of the pedon: From the intersection of U.S. Highways 59 and 80 in Marshall, 14.7 miles east on U.S. Highway 80, about 2.45 miles south on Farm Road 9, about 0.65 mile east then 2.0 miles south on a county road, 1.55 miles east and 0.05 mile south on a oil field road, and 100 feet east in an area of woodland.

8/ Location of the pedon: From the intersection of U.S. Highways 59 and 80 in Marshall, 0.5 mile south on U.S. Highway 59, about 8.95 miles southeast on Texas Highway 31, about 4.85 miles east on Farm Road 2625, and 200 feet south in an area of woodland.

9/ Location of the pedon: From the intersection of U.S. Highways 59 and 80 in Marshall, 15.5 miles east on U.S. Highway 80, about 0.55 mile north on Farm Road 134, about 0.4 mile east and south on a private road, and 50 feet east-northeast in an area of woodland.

10/ Location of the pedon: From the intersection of U.S. Highways 59 and 80 in Marshall, 10.4 miles south on U.S. Highway 59, about 3.65 miles southeast on Farm Road 1186, about 0.45 mile east on a county road, 0.5 mile north along a highline, and 325 feet northwest in an area of woodland.

11/ Location of the pedon: From the intersection of U.S. Highways 59 and 80 in Marshall, 1.5 miles south on U.S. Highway 59, about 11.55 miles southwest on Texas Highway 43, about 0.8 miles southeast and 0.15 miles east on a private road, and 100 feet south in an area of woodland.

12/ Location of the pedon: From the intersection of U.S. Highways 59 and 80 in Marshall, 0.5 mile south on U.S. Highway 59, about 15.8 miles southeast on Texas Highway 31, about 4.75 miles east on Farm Road 451, about 1.2 miles north on Farm Road 9, and 400 feet west in a pasture.

13/ Location of the pedon: From the intersection of U.S. Highways 59 and 80 in Marshall, 1.8 miles north on U.S. Highway 59, about 2.2 miles west on Loop 390, about 3.5 miles north on Farm Road 1997, about 1.0 mile northeast on a county road, 0.75 mile west on a private road, and 250 feet northwest of a fence corner.

14/ Location of the pedon: From the intersection of U.S. Highways 59 and 80 in Marshall, 0.5 mile south on U.S. Highway 59, about 15.8 miles southeast on Texas Highway 31, about 4.75 miles east on Farm Road 451, about 1.2 miles north on Farm Road 9, and 400 feet west in a pasture.

TABLE 21.--PHYSICAL ANALYSES OF SELECTED SOILS

(Dashes indicate that data were not available)

Soil name and sample number	Depth	Horizon	Particle-size distribution: Sand: Very Coarse (2-1 mm)	Coarse (1-0.5 mm)	Medium (0.5-0.25 mm)	Fine (0.25-0.1 mm)	Very fine (0.1-0.05 mm)	Total (2-0.05 mm)	Silt 0.05-0.002 mm	Clay <0.002 mm	COLE (whole soil)	Bulk density: 1/3 bar	Air-dry	Water content 1/3 bar
	In		Pct	Pct	Pct	Pct	Pct	Pct	Pct	Pct	Cm/cm	g/cc	g/cc	Pct (wt)
Bernaldo 1/ 2/ S84TX203-004	0-3	A	0.1	0.5	5.1	31.2	18.3	55.2	41.4	3.4	0.000	---	---	---
	3-11	E	0.3	0.5	5.0	30.1	16.4	52.3	42.1	5.6	0.009	---	---	---
	11-17	Bt1	0.2	0.3	3.5	23.9	12.8	40.7	44.6	14.7	0.027	---	---	---
	17-26	Bt2	0.1	0.4	3.0	25.5	8.6	37.6	37.7	24.7	0.018	---	---	---
	26-43	Bt3	0.2	0.7	3.6	27.2	9.0	40.7	36.2	23.1	0.011	---	---	---
	43-62	Bt/E1	0.1	0.3	3.7	29.1	8.9	42.1	31.9	26.1	0.020	---	---	---
	62-80	Bt/E2	0.0	0.2	4.1	33.2	7.1	44.6	31.7	23.7	0.029	---	---	---
	80-95	B't	0.0	0.1	4.6	33.8	3.7	42.2	34.6	23.2	0.000	---	---	---
Bowie 3/ 4/ S80TX203-001	5-11	E	---	---	---	---	---	---	---	---	0.002	1.53	1.54	8.8
	11-29	Bt1	---	---	---	---	---	---	---	---	0.011	1.49	1.54	17.8
	41-57	Btv2	---	---	---	---	---	---	---	---	0.010	1.66	1.71	16.5
Bowie 2/ 3/ S83TX203-001	0-5	Ap	2.5	0.5	1.4	25.3	41.9	71.6	25.2	3.2	---	1.60	---	---
	5-10	E	1.3	0.5	0.8	22.8	37.5	62.9	31.1	6.0	0.002	1.69	1.70	8.7
	10-23	Bt1	1.3	0.4	0.6	12.3	31.9	46.5	26.8	26.7	0.022	1.57	1.68	19.9
	23-31	Bt2	1.2	0.7	0.6	10.7	30.6	43.8	25.1	31.1	0.021	1.69	1.80	18.8
	31-46	Btv	1.1	0.4	0.6	15.7	31.5	49.3	26.2	24.5	0.013	1.76	1.83	16.8
	46-57	Btv/E1	1.5	1.2	1.2	20.3	32.8	57.0	22.3	20.7	0.013	1.79	1.86	16.1
	57-68	Btv/E2	0.9	0.9	1.4	20.3	36.1	59.6	19.0	21.4	---	1.80	---	---
	68-83	B't	0.7	1.0	1.1	17.6	36.8	57.0	14.8	28.2	0.013	1.75	1.82	17.6
	83-106	BC	0.2	0.5	0.9	17.3	39.3	58.8	12.1	29.1	0.019	1.71	1.81	20.1
Cart 3/ 5/ S80TX203-002	5-13	E1	---	---	---	---	---	---	---	---	0.000	1.48	1.48	5.6
	23-32	Bt/E1	---	---	---	---	---	---	---	---	0.015	1.71	1.79	13.9
	49-81	Btx/E	---	---	---	---	---	---	---	---	0.016	1.68	1.76	14.2
Cypress 1/ 2/ S87TX203-006	0-6	Ag	0.2	0.2	0.9	7.1	5.1	13.5	26.3	60.2	---	---	---	---
	6-23	Cg1	0.0	0.0	0.7	6.1	8.5	15.3	33.1	51.6	---	---	---	---
	23-40	Cg2	0.0	0.1	0.4	2.5	9.2	12.2	36.9	50.9	---	---	---	---
Cypress 1/ 6/ S87TX203-007	0-4	Ag	0.0	0.1	0.2	3.7	11.6	15.6	32.7	51.7	---	---	---	---
	4-24	Cg1	0.2	0.4	0.4	5.9	18.7	25.6	32.3	42.1	---	---	---	---
	24-40	Cg2	0.1	0.4	0.5	3.3	15.9	20.2	39.1	40.7	---	---	---	---
Cypress 1/ 7/ S87TX203-008	6-28	Cg1	0.1	0.1	0.2	0.8	6.1	7.3	39.1	53.6	---	---	---	---
	28-40	Cg2	0.0	0.0	0.0	0.4	8.3	8.7	37.4	53.9	---	---	---	---
Eastwood 1/ 8/ S84TX203-005	7-25	Bt1	1.0	0.7	0.5	4.2	8.9	15.3	43.3	41.4	---	---	---	---
	25-33	Bt2	0	0.1	0.1	0.1	2.9	3.2	44.1	52.7	---	---	---	---

See footnotes at end of table.

TABLE 21.--PHYSICAL ANALYSES OF SELECTED SOILS--Continued

Soil name and sample number	Depth	Horizon	Particle-size distribution: Sand: Very Coarse (2-1 mm)	Coarse (1-0.5 mm)	Medium (0.5-0.25 mm)	Fine (0.25-0.1 mm)	Very fine (0.1-0.05 mm)	Total (2-0.05 mm)	Silt 0.05-0.002 mm	Clay <0.002 mm	COLE (whole soil)	Bulk density: 1/3 bar	Air-dry	Water content 1/3 bar
	In		Pct	Pct	Pct	Pct	Pct	Pct	Pct	Pct	Cm/cm	g/cc	g/cc	Pct(wt)
Eastwood 1/ 9/	7-23	Bt1	0.3	0.5	0.3	1.2	7.5	9.8	25.5	64.7	0.122	1.18	1.64	40.6
S84TX203-006	23-36	Bt2	0.1	0.5	0.4	1.0	8.5	10.5	34.0	55.5	---	---	---	---
Eastwood 1/ 10/	6-14	Bt1	0.4	0.9	0.5	4.3	8.6	14.7	24.8	60.5	---	---	---	---
S84TX203-007	14-33	Bt2	0.0	0.0	0.1	4.1	10.4	14.6	30.9	54.5	0.138	1.22	1.80	39.4
Eastwood 1/ 11/	5-16	Bt1	0.2	0.2	1.0	21.9	8.7	32.0	21.5	46.5	0.092	1.23	1.60	37.7
S84TX203-008	16-32	Bt2	0.0	0.1	0.5	30.6	11.1	42.3	22.4	35.3	---	---	---	---
Eastwood 1/ 12/	4-8	Bt1	0.3	0.8	2.7	15.0	14.1	32.9	23.9	43.2	---	---	---	----
S84TX203-009	8-17	Bt2	0.2	0.5	1.9	11.7	14.9	29.2	26.1	44.7	---	1.38	1.70	30.6
Eastwood 1/ 13/	2-10	Bt1	0.7	0.7	4.2	7.3	16.8	29.7	18.3	52.0	---	---	---	---
S84TX203-010	10-18	Bt2	0.1	0.3	2.0	6.0	18.5	26.9	22.7	50.4	0.103	1.29	1.73	33.1
Eastwood 1/ 14/	0-3	A	0.1	0.1	0.4	3.8	17.3	21.7	63.8	14.5	---	---	---	---
S85TX203-002	3-8	EB	0.5	0.2	0.4	3.5	17.5	22.1	54.6	23.3	---	---	---	---
	8-12	Bt1	0.2	0.3	0.6	2.3	13.0	16.4	37.4	46.2	---	---	---	---
	12-17	Bt2	0.0	0.1	0.7	2.3	9.6	12.7	36.8	50.5	---	---	---	---
	17-23	Bt3	0.0	0.0	0.4	2.0	7.5	9.9	38.7	51.4	---	---	---	---
	23-28	Bt4	0.0	0.1	0.2	0.7	5.9	6.9	42.0	51.1	---	---	---	---
	8-37	Bt5	0.1	0.1	0.2	0.4	7.2	8.0	48.4	43.6	---	---	---	---
	37-46	Bt6	0.0	0.1	0.1	0.4	8.4	9.0	55.8	35.2	---	---	---	---
	46-51	BC	0.0	0.1	0.2	2.2	36.6	39.1	35.2	25.7	---	---	---	---
	51-72	C	0.0	0.1	0.1	0.4	7.4	8.0	60.1	31.9	---	---	---	---
Elrose 3/ 15/	12-32	Bt1, Bt2	0.0	0.3	3.1	25.8	17.5	46.7	31.6	21.7	---	---	---	---
S83TX203-002														
Elrose 1/ 2/	0-5	Ap	0.4	0.5	10.5	41.1	18.0	70.5	27.4	2.1	---	---	---	---
S85TX203-001	5-11	E	0.1	0.4	10.6	36.1	15.2	62.4	32.5	5.1	---	---	---	---
	11-19	Bt1	0.1	0.3	7.9	27.7	12.3	48.3	30.9	20.8	---	---	---	---
	19-28	Bt2	0.1	0.2	6.6	23.3	10.0	40.2	28.6	31.2	---	---	---	---
	28-36	Bt3	0.7	0.3	6.9	24.4	10.0	42.3	27.3	30.4	---	---	---	---
	36-44	Bt4	0.5	0.2	6.5	23.6	8.5	39.3	24.1	36.6	---	---	---	---
	44-55	Bt5	0.1	0.1	5.7	22.1	5.5	33.5	18.3	48.2	---	---	---	---
	55-69	Bt6	0.0	0.0	6.1	26.8	4.6	37.5	18.8	43.7	---	---	---	---
	69-85	Bt7	0.5	0.3	4.2	28.6	5.7	39.3	19.5	41.2	---	---	---	---
	85-105	2BC	0.0	0.0	0.3	8.3	11.4	20.0	35.9	44.1	---	---	---	---
Erno 3/ 16/	4-13	E	---	---	---	---	---	0.0	0.0	0.0	0.000	1.63	1.63	7.8
S80TX203-003	13-25	Bt1	---	---	---	---	---	0.0	0.0	0.0	0.022	1.61	1.72	21.3
	51-61	Btx2	---	---	---	---	---	0.0	0.0	0.0	0.013	1.71	1.78	15.4

See footnotes at end of table.

TABLE 21.--PHYSICAL ANALYSES OF SELECTED SOILS--Continued

Soil name and sample number	Depth	Horizon	Particle-size distribution: Sand: Very Coarse (2-1 mm)	Coarse (1-0.5 mm)	Medium (0.5-0.25 mm)	Fine (0.25-0.1 mm)	Very fine (0.1-0.05 mm)	Total (2-0.05 mm)	Silt 0.05-0.002 mm	Clay <0.002 mm	COLE (whole soil)	Bulk density 1/3 bar	Bulk density Air-dry	Water content 1/3 bar
	In		Pct	Pct	Pct	Pct	Pct	Pct	Pct	Pct	Cm/cm	g/cc	g/cc	Pct(wt)
Erno 1/ 14/ S85TX203-003	0-4	Ap	0.2	0.4	2.2	18.0	19.6	40.4	55.6	4.0	---	---	---	---
	4-9	E	0.1	0.4	2.2	18.4	21.2	42.3	52.5	5.2	---	---	---	---
	9-15	Bt1	0.2	0.4	1.9	17.0	21.0	40.5	46.5	13.0	---	---	---	---
	15-26	Bt2	0.3	0.4	1.7	15.4	19.6	37.4	35.4	27.2	---	---	---	---
	26-36	Bt3	0.2	0.4	1.8	17.4	21.3	41.1	36.4	22.5	---	---	---	---
	36-50	Btx	0.2	0.4	2.1	19.1	21.3	43.1	35.8	21.1	---	---	---	---
	50-68	Btx/E1	0.2	0.4	2.5	20.8	22.2	46.1	35.0	18.9	---	---	---	---
	68-75	Btx/E2	0.2	0.6	2.6	22.7	24.0	50.1	33.5	16.4	---	---	---	---
	75-88	Btx/E3	0.0	0.5	3.0	25.9	25.9	55.3	32.8	11.9	---	---	---	---
Estes 3/ 17/ S82TX203-001	14-36	Bg1	0.0	0.2	1.6	22.2	19.7	43.7	20.9	35.4	0.045	1.55	1.78	21.3
Latex 1/ 18/ S84TX203-003	0-3	A	2.1	1.5	4.7	35.5	12.6	56.4	39.9	3.7	---	---	---	---
	3-6	E	2.7	1.7	4.4	33.5	16.9	59.2	36.0	4.8	0.000	1.45	1.44	28.2
	6-12	BE	1.1	1.0	3.9	33.9	9.8	49.7	41.1	9.2	0.005	1.33	1.35	15.4
	12-26	Bt1	1.0	0.8	2.8	23.7	8.2	36.5	33.1	30.4	0.015	1.28	1.34	23.2
	26-38	Bt2	3.0	2.1	3.5	24.5	7.1	40.2	30.9	28.9	0.005	1.43	1.45	21.9
	38-43	2Bt/E1	1.4	1.0	2.3	18.7	10.8	34.2	29.5	36.3	0.017	1.33	1.40	24.9
	43-47	2Bt/E2	0.6	0.5	2.0	11.5	11.7	26.3	32.2	41.5	0.065	1.30	1.57	26.6
	47-63	2Btg1	0.2	0.1	0.7	6.2	7.5	14.7	33.9	51.4	---	---	---	---
	63-80	2Btg2	0.0	0.0	0.5	5.3	12.3	18.1	33.2	48.7	0.067	1.30	1.58	30.7
	80-92	2BCg	0.0	0.0	0.2	7.2	22.9	30.3	29.0	40.7	0.086	1.28	1.64	32.2
Nugent 2/ 3/ S83TX203-003	13-40	C1, C2	0.0	0.0	0.6	67.4	22.4	90.4	4.8	4.8	---	---	---	---
Sacul 1/ 19/ S87TX203-001	0-4	A	1.3	1.1	1.1	8.4	42.3	54.2	40.2	5.6	0.005	1.44	1.46	23.8
	4-7	E	1.2	1.0	1.0	8.3	39.8	51.3	40.9	7.8	0.007	1.50	1.53	20.2
	7-15	Bt1	0.4	0.3	0.4	2.9	9.2	13.2	17.3	69.5	0.077	1.21	1.51	35.5
	15-23	Bt2	1.4	1.4	1.4	4.2	7.7	16.1	21.2	62.7	0.052	1.29	1.50	35.8
	23-32	Bt3	0.8	1.2	1.3	5.0	8.3	16.6	26.1	57.3	0.034	1.32	1.47	34.2
	32-40	Bt4	1.1	1.3	1.4	5.0	8.4	17.2	27.7	55.1	0.036	1.34	1.49	32.2
	40-47	Bt5	0.7	1.3	1.6	5.8	8.5	17.9	28.2	53.9	0.033	1.36	1.50	34.1
	47-53	Bt6	1.3	1.3	2.3	9.1	8.3	22.3	28.8	48.9	0.026	1.39	1.50	31.5
	53 61	CB	0.4	0.6	0.4	1.2	17.0	19.6	40.8	39.6	0.020	1.48	1.57	26.2
	61 80	C	0.9	1.0	0.6	0.6	1.8	4.9	45.8	49.3	0.021	1.39	1.48	31.5
Sawyer 3/ 20/ S80TX203-004	3-8	E	---	---	---	---	---	---	---	0.0	0.002	1.54	1.55	13.5
	8-19	Bt1	---	---	---	---	---	---	---	0.0	0.028	1.49	1.62	22.0
	46-65	Bt4	---	---	---	---	---	---	---	0.0	0.025	1.58	1.70	22.4

See footnotes at end of table.

TABLE 21.--PHYSICAL ANALYSES OF SELECTED SOILS--Continued

Soil name and sample number	Depth	Horizon	Particle-size distribution: Sand: Very Coarse (2-1 mm)	Coarse (1-0.5 mm)	Medium (0.5-0.25 mm)	Fine (0.25-0.1 mm)	Very fine (0.1-0.05 mm)	Total (2-0.05 mm)	Silt 0.05-0.002 mm	Clay <0.002 mm	COLE (whole soil)	Bulk density: 1/3 bar	Bulk density: Air-dry	Water content 1/3 bar
	In		Pct	Pct	Pct	Pct	Pct	Pct	Pct	Pct	Cm/cm	g/cc	g/cc	Pct (wt)
Scottsville 1/ 21/	0-4	A	0.2	0.4	0.5	32.7	3.8	37.7	58.1	4.2	---	---	---	---
	4-8	E	0.4	0.6	0.8	32.1	9.3	43.2	52.2	4.6	0.030	1.41	1.54	30.0
S84TX203-001	8-13	Bt1	0.5	0.6	0.6	23.9	14.4	40.0	49.8	10.2	0.024	1.38	1.48	27.0
	13-18	Bt2	0.4	0.4	0.6	26.6	4.5	32.7	48.8	18.5	0.036	1.35	1.50	32.1
	18-21	Bt/E	0.3	0.4	0.4	17.1	14.5	32.6	41.2	26.2	0.040	1.36	1.53	26.0
	21-32	2Btg1	0.0	0.0	0.2	8.8	10.7	19.7	29.7	50.6	0.110	1.30	1.78	35.6
	32-41	2Btg2	0.0	0.1	0.1	10.4	15.3	25.9	32.3	41.8	0.087	1.48	1.90	25.7
	41-51	2Btg3	0.0	0.1	0.1	26.3	23.7	50.2	21.9	27.9	0.078	1.50	1.88	25.0
	51-66	2BC	0.1	0.1	0.1	50.5	18.6	69.4	16.8	13.8	0.038	1.60	1.79	19.3
	66-84	2C	0.0	0.0	0.1	5.3	22.0	27.4	46.2	26.4	0.049	1.50	1.73	23.8
Scottsville 1/ 22/	0-4	Ap	0.2	0.4	0.7	45.1	15.3	61.7	34.9	1.1	0.037	1.23	1.37	40.9
	4-12	E	0.3	0.3	0.6	40.9	11.5	53.6	39.5	3.3	0.011	1.54	1.59	21.3
S84TX203-002	12-19	Bt	0.2	0.5	0.5	36.9	11.4	49.5	37.7	8.2	0.027	1.44	1.56	25.1
	19-30	Bt/E1	0.2	0.4	0.5	36.7	5.2	43.0	36.5	13.4	0.022	1.47	1.57	22.0
	30-33	Bt/E2	0.2	0.4	0.4	32.6	7.0	40.6	29.6	19.5	0.033	1.39	1.53	27.8
	33-48	2Btg1	0.2	0.0	0.1	26.1	2.3	28.7	18.9	39.4	0.115	1.37	1.90	31.9
	48-60	2Btg2	0.0	0.1	0.2	30.2	2.6	33.1	21.2	31.1	---	---	---	---
	60-70	2BCtg1	0.0	0.0	0.1	23.6	0.7	24.1	27.0	26.4	---	---	---	---
	70-80	2BCtg2	0.0	0.0	0.1	13.1	2.0	15.2	34.9	18.7	0.113	1.34	1.85	35.7
	80-94	2C	0.0	0.0	0.2	9.5	12.8	22.5	44.4	11.5	0.072	1.33	1.64	32.9

See footnotes on next page.

TABLE 21.--PHYSICAL ANALYSES OF SELECTED SOILS--Continued

1/ Analysis by Soil Characterization Laboratory, Texas A&M University, College Station, Texas.

2/ Location of the pedon sampled is the same as that of the pedon desribed as typical of series in the section "Soil Series and Their Morphology."

3/ Analysis by Soil Survey Laboratory, Soil Conservation Service, Lincoln, Nebraska.

4/ Location of the pedon: From the intersection of U.S. Highways 59 and 80 in Marshall, 2.7 miles west on U.S. Highway 80, about 0.75 mile north on Loop 390, about 1.6 miles northwest on Farm Road 154, about 2.95 miles north and 0.5 mile southwest on a county road, 0.1 mile west on a private road, and 200 feet south in a pasture.

5/ Location of the pedon: From the intersection of U.S. Highways 59 and 80 in Marshall, 8.4 miles north on U.S. Highway 59, about 2.1 miles west on Farm Road 1997, about 0.3 mile south on a county road, and 75 feet east in an area of woodland.

6/ Location of the pedon: From the intersection of U.S. Highways 59 and 80 in Marshall, 0.2 mile north on U.S. Highway 59, about 14.0 miles northeast on Texas Highway 43, about 5.0 miles east on Farm Road 2198 to Uncertain, 0.8 mile northeast by boat, and 20 feet south in an area of baldcypress.

7/ Location of the pedon: From the intersection of U.S. Highways 59 and 80 in Marshall, 0.2 mile north on U.S. Highway 59, about 14.0 miles northeast on Texas Highway 43, about 5.0 miles east on Farm Road 2198 to Uncertain, 0.7 mile north-northeast by boat, and 40 feet north in an area of baldcypress.

8/ Location of the pedon: From the intersection of U.S. Highways 59 and 80 in Marshall, 0.5 mile south on U.S. Highway 59, about 11.5 miles southeast on Texas Highway 31, and 400 feet west of a fence in an area of woodland.

9/ Location of the pedon: From the intersection of U.S. Highways 59 and 80 in Marshall, 0.5 mile south on U.S. Highway 59, about 8.95 miles southeast on Texas Highway 31, about 12.2 miles east on Farm Road 2625, about 0.65 mile north on a county road, 0.5 mile west on a private road, and 70 feet west in an area of woodland.

10/ Location of the pedon: From the intersection of U.S. Highways 59 and 80 in Marshall, 11.2 miles east on U.S. Highway 80, about 0.1 mile south and 1.75 miles east on a service road, 2.0 miles south on a county road, and 50 feet east in an area of woodland.

11/ Location of the pedon: From the intersection of U.S. Highways 59 and 80 in Marshall, 14.7 miles east on U.S. Highway 80, about 2.45 miles south on Farm Road 9, about 0.65 mile east and then 2.0 miles south on a county road, 1.55 miles east and 0.05 mile south on an oil field road, and 100 feet east in an area of woodland.

12/ Location of the pedon: From the intersection of U.S. Highways 59 and 80 in Marshall, 0.5 mile south on U.S. Highway 59, about 8.95 miles southeast on Texas Highway 31, about 4.85 miles east on Farm Road 2625, and 200 feet south in an area of woodland.

13/ Location of the pedon: From the intersection of U.S. Highways 59 and 80 in Marshall, 15.5 miles east on U.S. Highway 80, about 0.55 mile north on Farm Road 134, about 0.4 mile east and south on a private road, and 50 feet east-northeast in an area of woodland.

14/ Location of the pedon sampled is the same as that of the pedon described as typical of series in "Soil Series and Their Morphology." This pedon has slightly more silt in the surface layer than is typical for the official series.

15/ Location of the pedon: From the intersection of U.S. Highways 59 and 80 in Marshall, 1.5 miles south on U.S. Highway 59, about 11.1 miles southwest on Texas Highway 43, about 1.0 mile East and 1.1 mile south on a county road, 100 feet east on a private road, and 100 feet north in a pasture.

16/ Location of the pedon: From the intersection of U.S. Highways 59 and 80 in Marshall, 8.4 miles north on U.S. Highway 59, about 2.1 miles west on Farm Road 1997, about 0.3 mile south on a county road, and 200 feet southeast in an area of woodland.

17/ Location of the pedon: From the intersection of U.S. Highways 59 and 80 in Marshall, 1.5 miles south on U.S. Highway 59, about 11.55 miles southwest on Texas Highway 43, about 0.8 mile southeast and 0.15 mile east on a private road, and 100 feet south in an area of woodland.

18/ Location of the pedon: From the intersection of U.S. Highways 59 and 80 in Marshall, 10.4 miles south on U.S. Highway 59, about 3.65 miles southeast on Farm Road 1186, about 0.45 mile east on a county road, 0.5 mile north along a highline, and 325 feet northwest in an area of woodland.

19/ Location of the pedon: From the intersection of U.S. Highways 59 and 80 in Marshall, 1.8 miles north on U.S. Highway 59, about 2.2 miles west on Loop 390, about 3.5 miles north on Farm Road 1997, about 1.0 mile northeast on a county road, 0.75 mile west on a private road, and 250 feet northwest of a fence corner.

20/ Location of the pedon: From the intersection of U.S. Highways 59 and 80 in Marshall, 8.4 miles north on U.S. Highway 59, about 2.9 miles west on Farm Road 1997, about 1.1 miles south on a county road, and 0.3 mile west in a pasture.

21/ Location of the pedon: From the intersection of U.S. Highways 59 and 80 in Marshall, 0.5 mile south on U.S. Highway 59, about 15.8 miles southeast on Texas Highway 31, about 4.75 miles east on Farm Road 451, about 1.2 miles north on Farm Road 9, and 400 feet west in a pasture.

22/ Location of the pedon sampled is the same as that of the pedon described as typical of series in the section "Soil Series and Their Morphology." This pedon has a slightly higher content of fine sand in the surface layer than is typical for the official series.

TABLE 22.--CLAY MINERALOGY OF SELECTED SOILS

(Dashes indicate that data were not available)

Soil name and sample number	Depth	Horizon	Clay mineralogy 1/ (X-ray <2 Microns)						
			Smectite	Vermiculite	Kaolinite	Mica	Gibbsite	Quartz	Goethite
	In								
Bowie 2/ 3/	0-5	Ap	---	Trace	Low	---	---	---	---
S83TX203-001	10-23	Bt1	---	Medium	Medium	Trace	---	---	Trace
	23-31	Bt2	---	Medium	Low	Trace	---	---	Trace
	68-83	B′t	Low	Low	Medium	Trace	---	---	Medium
Eastwood 2/ 4/	7-25	Bt1	Medium	---	Medium	Low	---	Low	---
S84TX203-005	25-33	Bt2	High	---	Medium	Low	---	Low	---
Eastwood 2/ 5/	7-23	Bt1	Medium	---	Medium	Low	---	Low	---
S84TX203-006	23-36	Bt2	High	---	Medium	Trace	---	Low	---
Eastwood 2/ 6/	6-14	Bt1	High	---	Medium	Trace	---	Low	---
S84TX203-007	14-33	Bt2	High	---	Medium	Trace	---	Low	---
Eastwood 2/ 7/	5-16	Bt1	High	Trace	Low	Medium	---	---	---
S84TX203-008	16-32	Bt2	High	Trace	Low	Medium	---	---	---
Eastwood 2/ 8/	4-8	Bt1	Medium	Trace	Low	Medium	---	---	---
S84TX203-009	8-17	Bt2	High	Trace	Low	Medium	---	---	---
Eastwood 2/ 9/	2-10	Bt1	High	Trace	Low	Medium	---	---	---
S84TX203-010	10-18	Bt2	High	Trace	Low	Medium	---	---	---
Estes 10/ 11/ S82TX203 001	14-36	Bgl	High	---	Medium	Medium	Trace	---	---

1/ These ratings represent relative amounts.

2/ Analysis by Soil Characterization Laboratory, Texas A&M University, College Station, Texas.

3/ Location of the pedon sampled is the same as that of the pedon described as typical of series in the section "Soil Series and Their Morphology."

4/ Location of the pedon: From the intersection of U.S. Highways 59 and 80 in Marshall, 0.5 mile south on U.S. Highway 59, about 11.5 miles southeast on Texas Highway 31, and 400 feet west of a fence in an area of woodland.

5/ Location of the pedon: From the intersection of U.S. Highways 59 and 80 in Marshall, 0.5 mile south on U.S. Highway 59, about 8.95 miles southeast on Texas Highway 31, about 12.2 miles east on Farm Road 2625, about 0.65 mile north on a county road, 0.5 mile west on private road, and 70 feet west in an area of woodland.

6/ Location of the pedon: From the intersection of U.S. Highways 59 and 80 in Marshall, 11.2 miles east on U.S. Highway 80, about 0.1 mile south and 1.75 miles east on a service road, 2.0 miles south on a county road, and 50 feet east in an area of woodland.

7/ Location of the pedon: From the intersection of U.S. Highways 59 and 80 in Marshall, 14.7 miles east on U.S. Highway 80, about 2.45 miles south on Farm Road 9, about 0.65 mile east and then 2.0 miles south on a county road, 1.55 miles east and 0.05 mile south on an oil field road, and 100 feet east in an area of woodland.

8/ Location of the pedon: From the intersection of U.S. Highways 59 and 80 in Marshall, 0.5 mile south on U.S. Highway 59, about 8.95 miles southeast on Texas Highway 31, about 4.85 miles east on Farm Road 2625, and 200 feet south in an area of woodland.

9/ Location of the pedon: From the intersection of U.S. Highways 59 and 80 in Marshall, 15.5 miles east on U.S. Highway 80, about 0.55 mile north on Farm Road 134, about 0.4 mile east and south on a private road, and 50 feet east-northeast in an area of woodland.

10/ Analysis by Soil Survey Laboratory, Soil Conservation Service, Lincoln, Nebraska.

11/ Location of the pedon: From the intersection of U.S. Highways 59 and 80 in Marshall, 1.5 miles south on U.S. Highway 59, about 11.55 miles southwest on Texas Highway 43, about 0.8 miles southeast and 0.15 miles east on a private road, and 100 feet south in an area of woodland.

TABLE 23.--ENGINEERING INDEX TEST DATA

(Dashes indicate that data were not available. LL means liquid limit; PI, plasticity limit; and NP, nonplastic)

Soil name and sample number	Horizon	Depth	Classification: AASHTO	Classification: Unified	Grain-size distribution: Percentage passing sieve-- 5/8 inch	3/8 inch	No. 4	No. 10	No. 40	No. 200	Percentage smaller than-- .05 mm	.005 mm	.002 mm	LL	PI	Particle density	Shrinkage: Limit	Linear	Ratio
		In												Pct		g/cc	Pct	Pct	
Bernaldo 1/ 2/	E	3-11	A-4	ML	100	100	100	99	98	59	45	---	---	15	---	2.63	17	---	1.8
S84TX203-004	Bt2	17-26	A-6(14)	CL	100	100	99	98	97	72	65	---	---	36	22	2.64	14	11.4	1.94
	Bt/E1	43-62	A-6(10)	CL	100	100	100	99	98	60	58	---	---	37	22	2.66	15	10.9	1.89
	BC	80-95	A-6(10)	CL	100	100	100	100	99	64	55	---	---	34	20	2.66	16	9.3	1.91
Bienville 1/ 3/	E1	8-28	A-4(00)	SM	100	100	100	100	100	44	30	6	3	18	1	2.65	17	0.3	1.71
S80TX203-011	Bt/E1	44-62	A-4(00)	SM	100	100	100	100	100	43	34	20	8	20	2	2.67	19	0.1	1.77
	Bt/E3	72-80	A-4(00)	SM	100	100	100	100	100	44	31	15	14	23	3	2.65	20	1.6	1.75
Bowie 1/ 4/	E	5-11	A-4(00)	CL-ML	100	100	99	98	96	55	42	12	8	20	5	2.67	16	2.2	1.82
S80TX203-001	Bt	11-29	A-6(05)	CL	100	100	94	87	83	57	43	32	28	34	14	2.63	18	8.2	1.79
	Btv2	41-57	A-6(03)	SC	100	100	100	99	98	46	37	27	24	33	13	2.71	21	6.2	1.70
Bowie 1/ 2/	E	5-10	A-4	SM	100	99	97	94	92	---	38	---	---	20	1	2.63	19	0.5	1.68
S83TX203-003	Bt1	10-23	A-4(06)	CL	100	99	98	96	94	64	56	30	27	30	14	2.69	18	6.7	1.81
	Btv/E	46-68	A-4(05)	SC	100	99	97	96	96	48	41	---	---	36	17	2.71	19	8.2	1.77
	B't	68-83	A-7-6(10)	CL	100	100	99	99	99	57	45	---	---	41	22	2.71	19	10.7	1.80
Cart 1/ 5/	E	13-23	A-4(00)	ML	100	100	100	99	99	56	41	10	7	17	2	2.66	16	0.1	1.79
S80TX203-009	Bt/E1	23-32	A-4(01)	CL-ML	100	100	100	99	99	61	45	18	15	23	6	2.68	18	3.3	1.83
	Btx/E	49-81	A-6(05)	CL	100	100	99	97	95	55	45	26	24	32	15	2.70	17	7.6	1.80
Cuthbert 1/ 6/	A	0-4	A-4(00)	SM	100	97	93	87	80	44	33	6	3	31	5	2.61	26	2.3	1.51
S80TX203-002	Bt1	6-16	A-7-5(31)	CH	100	100	98	93	89	83	80	77	60	64	33	2.75	17	18.4	1.81
Cuthbert 1/ 7/	A	0-6	A-2-4(0)	SM	99	95	88	80	75	31	19	5	3	32	7	2.55	25	3.3	1.51
S80TX203-005	Bt1	17-29	A-6(07)	SC	100	100	96	88	84	51	57	37	35	39	21	2.72	19	9.8	1.76
Cypress 2/ 8/	Ag	0-6	A-7	MH	100	100	100	100	---	96	91	67	49	56	26	---	---	---	---
S87TX203-005	Cg1	6-23	A-7 6(17)	CL	100	100	100	100	98	82	73	54	39	45	20	---	---	---	---
	Cg2	23-40	A-7 6(26)	CL	100	100	100	100	100	100	86	61	49	48	22	---	---	---	---
Darbonne 1/ 2/	A	0-6	A-2-4(0)	SM	100	98	95	90	88	30	23	5	4	19	1	2.62	18	---	1.70
S85TX203-004	E	6-21	A-4(0)	SM	100	96	91	81	78	36	31	11	7	16	2	2.64	14	1.5	1.89
	Bt1	21-34	A-4(0)	SM-SC	100	96	90	85	82	44	39	18	14	20	5	2.61	16	2.6	1.83
	Bt2	34-41	A-2-6(1)	SC	100	86	74	63	58	27	23	15	13	29	16	2.64	17	6.6	1.84
Darden 8/ 9/	Bw1	19-40	A-3	SP-SM	100	100	100	100	97	8	8	3	---	--	NP	---	---	---	---
S87TX203-004	Bw/E	70-80	A-3	SP-SM	100	100	100	100	100	10	10	3	---	--	NP	---	---	---	---

See footnotes at end of table.

TABLE 23.--ENGINEERING INDEX TEST DATA--Continued

Soil name and sample number	Horizon	Depth	Classification: AASHTO	Classification: Unified	Grain-size distribution: Percentage passing sieve--5/8 inch	3/8 inch	No. 4	No. 10	No. 40	No. 200	Percentage smaller than--.05 mm	.005 mm	.002 mm	LL	PI	Particle density	Shrinkage: Limit	Linear	Ratio
		In												Pct		g/cc	Pct	Pct	
Eastwood 1/ 10/	EB	3-8	A-6(17)	CL	100	100	100	100	100	89	73	38	29	37	20	2.70	18	7.2	1.71
S85TX203-002	Bt1	8-12	A-7 6(38)	CH	100	100	100	100	100	94	88	58	51	61	35	2.65	17	18.3	1.86
	Bt2	12-17	A-7 6(44)	CH	100	100	100	100	100	90	81	55	52	71	43	2.71	18	20.8	1.87
	Bt3	17-23	A-7 6(49)	CH	100	100	100	100	100	96	86	56	51	71	44	2.67	19	19.8	1.80
	Bt5	28-37	A-7 6(55)	CH	100	100	100	100	100	99	89	54	40	71	48	2.64	16	21.0	1.89
	C	51-72	A-7 6(50)	CH	100	100	100	100	100	98	92	48	37	68	44	2.65	24	16.1	1.69
Elrose 1/ 11/	E	2-12	A-4(00)	SM	100	100	100	100	99	45	30	---	---	17	1	2.65	15	1.5	1.78
S84TX203-005	Bt1	12-24	A-6(04)	CL	100	100	100	100	99	60	50	---	---	25	12	2.68	14	6.1	1.89
	Bt4	60-82	A-6(07)	CL	100	100	100	100	100	58	55	---	---	32	18	2.66	14	9.2	1.93
Elrose 1/ 2/	E	5-11	A-4(0)	SM-SC	100	100	100	100	99	47	43	12	9	19	5	2.71	17	1.3	1.83
S85TX203-001	Bt1	11-19	A-6(7)	CL	100	100	100	100	99	59	53	30	25	31	17	2.63	17	7.8	1.86
	Bt2	19-28	A-6(12)	CL	100	100	100	100	99	64	58	38	34	39	23	2.63	17	10.8	1.86
	Bt3	28-36	A-6(11)	CL	100	100	99	98	97	61	57	39	34	39	23	2.66	17	10.6	1.85
	Bt4	36-44	A-7 6(20)	CL	100	99	96	94	93	63	60	44	40	48	37	2.65	17	13.6	1.84
	Bt5	44-55	A-7 6(22)	CH	100	100	100	100	100	72	71	58	52	56	31	2.69	20	15.2	1.76
	2BC	85-10	A-7 6(42)	CH	100	100	100	100	100	97	81	54	47	65	37	2.71	21	17.4	1.76
Erno 1/ 12/	E	4-13	A-4(00)	SM	100	100	100	100	97	47	30	8	5	19	2	2.63	18	0.3	1.77
S80TX203-010	Bt1	13-25	A-7-6(13)	CL	100	100	100	100	100	72	55	35	31	42	20	2.69	17	12.2	1.84
	Btx2	51-61	A-6(07)	CL	100	100	100	100	100	64	47	26	24	33	14	2.69	19	7.0	1.77
Erno 1/ 13/	E	4-9	A-4(0)	ML	100	100	100	100	99	68	59	15	9	19	4	2.65	18	---	1.78
S85TX203-003	Bt2	15-26	A-6(10)	CL	100	100	100	100	99	63	66	35	32	37	21	2.69	16	10.6	1.89
	Bt3	26-36	A-6(10)	CL	100	100	100	100	99	68	59	30	26	34	18	2.65	16	8.8	1.87
	Btx/E1	50-68	A-6(9)	CL	100	100	100	99	98	65	55	29	24	32	18	2.69	16	8.6	1.85
	Btx/E3	75-88	A-6(4)	CL	100	100	100	100	100	55	46	20	16	29	12	2.68	18	5.8	1.79
Estes 1/ 2/	A	0-4	A-7-6(17)	CH	100	100	100	100	100	69	61	---	---	54	25	2.6	20	13.4	1.62
S83TX203-001	Bg1	12-38	A-7-6(20)	CL	100	100	100	100	100	80	80	60	53	47	25	2.69	17	13.9	1.87
Kirvin 1/ 2/	E	6-14	A-4(00)	SM	98	97	96	94	92	48	32	7	5	18	2	2.65	16	1.2	1.77
S80TX203-003	Bt1	14-32	A-7-6(16)	CL	100	100	100	100	99	70	64	52	50	48	24	2.72	19	12.5	1.77
	BC	41-50	A-7-6(15)	CH	100	100	96	91	80	62	60	49	45	59	26	2.83	24	15.2	1.63
Kirvin 1/ 14/	A	0-4	A-2-4(0)	SM-SC	100	99	92	80	71	32	25	9	6	25	7	2.64	20	2.9	1.68
S80TX203-006	Bt1	8-20	A-7-6(9)	CL	100	100	98	94	90	53	46	40	38	42	25	2.75	17	12.0	1.81
Kirvin 1/ 15/	Bt	2-10	A-7-6(9)	CL	100	100	97	88	84	51	50	45	43	50	24	2.79	21	12.4	1.71
S80TX203-007																			

See footnotes at end of table.

TABLE 23.--ENGINEERING INDEX TEST DATA--Continued

Soil name and sample number	Horizon	Depth	Classification: AASHTO	Classification: Unified	Percentage passing sieve--: 5/8 inch	3/8 inch	No. 4	No. 10	No. 40	No. 200	Percentage smaller than--: .05 mm	.005 mm	.002 mm	LL	PI	Particle density	Shrinkage: Limit	Linear	Ratio
		In												Pct		g/cc	Pct	Pct	
Latch 1/ 2/ S83TX203-004	Ap	0-7	A-2-4(0)	SM	100	100	100	100	100	29	20	---	---	20	3	2.66	19	---	1.69
	E1	7-25	A-2-4(0)	SM	100	100	100	100	100	31	19	---	---	20	2	2.63	19	---	1.69
	Bt	60-72	A-4(01)	SM-SC	100	100	100	100	100	50	32	---	---	26	7	2.67	20	3.0	1.71
Latex 1/ 16/ S84TX203-003	E	3-6	A-4(00)	ML	100	100	99	97	92	53	37	---	---	19	3	2.65	16	1.4	1.78
	Bt1	12-26	A-6(11)	CL	100	100	99	97	96	71	62	---	----	34	18	2.64	17	8.7	1.87
	Bt2	26-38	A-6(03)	SC	100	94	75	64	62	41	37	---	----	37	18	2.7	17	10.0	1.86
	2Btg	47-63	A-7-6(40)	CH	100	100	99	99	98	92	79	---	----	60	40	2.72	16	18.4	1.93
Lilbert 2/ 8/ S88TX203-001	A	0-9	A-2-4	SM	100	100	100	100	99	20	16	3	----	--	NP	---	---	---	---
	Bt1	23-34	A-6(1)	SC	100	100	100	100	93	43	34	23	17	27	11	---	---	---	---
	Bt2	34-43	A-6(4)	SC	100	100	100	100	90	44	34	24	19	36	19	---	---	---	---
	Btv	43-60	A-6(1)	SC	100	100	100	100	97	42	34	23	15	29	11	---	---	---	---
Nugent 1/ 2/ S83TX203-002	A	0-6	A-4(02)	CL-ML	100	100	100	100	100	55	50	24	20	27	7	2.64	21	3.7	1.73
	C3	20-56	A-2-4(00)	SP-SM	100	100	100	100	100	10	6	---	----	24	4	2.65	16	3.8	1.80
	C4	56-80	A-2-4(00)	SP-SM	100	100	100	100	100	5	3	---	----	27	4	2.63	22	2.4	1.59
Pirkey 2/ 8/ S87TX203-003	Ap	0-6	A-4	ML	100	100	100	100	98	53	34	11	7	--	NP	---	---	---	---
	Cz	16-35	A-2-4(0)	SM	100	100	100	100	95	31	27	19	19	24	2	---	---	---	---
	2C	65-80	A-4(2)	CL-ML	100	100	100	100	99	62	53	30	23	25	7	---	---	---	---
Sacul 1/ 2/ S80TX203-004	A	0-3	A-4(03)	ML	100	100	100	99	97	72	39	8	6	30	6	2.59	25	2.7	1.52
	Bt1	6-16	A-7-6(31)	CH	100	100	100	100	100	92	84	63	59	52	31	2.69	13	17.2	1.94
	Bt2	16-30	A-7-6(27)	CL	100	100	100	97	97	87	78	54	48	50	29	2.67	15	15.3	1.88
Sawyer 1/ 17/ S80TX203-008	E	3-8	A-4(02)	CL-ML	100	100	100	100	98	80	56	18	10	22	5	2.65	17	2.3	1.78
	Btg	46-65	A-7-6(17)	CL	100	100	100	99	99	80	62	38	33	42	22	2.72	21	9.8	1.70
Scottsville 1/ 18/ S84TX203-001	E	4-8	A-4(02)	CL-ML	100	100	100	100	98	78	58	---	----	22	5	2.64	18	1.9	1.74
	Bt/E1	13-18	A-6(07)	CL	100	100	100	99	97	81	68	---	----	27	11	2.63	17	5.1	1.80
	2Btg1	21-32	A-7-6(36)	CH	100	100	100	100	99	89	82	---	----	57	38	2.68	13	19.0	1.97
	2Btg3	41-51	A-6(9)	CL	100	100	100	100	100	69	55	---	----	37	15	2.65	25	5.9	1.57
	2Cg	66-84	A-7-6(33)	CH	100	100	100	100	100	92	80	---	----	52	33	2.70	20	13.7	1.71
Scottsville 1/ 2/ S84TX203-002	Ap	0-4	A-4(01)	CL-ML	100	100	99	98	97	54	40	---	----	23	6	2.66	21	1.2	1.67
	Bt/E1	19-30	A-6(08)	CL	100	100	100	100	98	66	55	---	----	31	17	2.65	17	7.4	1.83
	2Btg1	33-48	A-7-6(30)	CH	100	100	100	99	99	73	71	---	----	61	42	2.73	13	19.9	1.98
	2C	80-94	A-7-6(37)	CH	100	100	100	100	100	91	80	---	----	58	37	2.69	21	15.1	1.72
Socagee 2/ 8/ S87TX203-002	Ag	0-7	A-6(16)	CL	100	100	100	100	100	93	92	45	28	38	16	---	---	---	---
	Bg2	21-40	A-6(11)	CL	100	100	100	100	97	82	77	35	27	31	15	---	---	---	---
	Bg3	40-60	A-6(10)	CL	100	100	100	100	96	82	75	36	29	30	15	---	---	---	---

See footnotes on next page.

1/ Analysis by Texas Department of Highways and Public Transportation Soil Laboratory, Austin, Texas.

2/ Location of the pedon sampled is the same as that of the pedon described as typical of series in the section "Soil Series and Their Morphology."

3/ Location of the pedon: From the intersection of U.S. Highways 59 and 80 in Marshall, 2.8 miles north on U.S. Highway 59, about 10.1 miles north-northeast on Farm Road 1793, about 2.0 miles north on Farm Road 134, and 250 feet west in a pasture.

4/ Location of the pedon: From the intersection of U.S. Highways 59 and 80 in Marshall, 2.7 miles west on U.S. Highway 80, about 0.75 mile north on Loop 390, about 1.6 miles northwest on Farm Road 154, about 2.95 miles north and 0.5 mile southwest on a county road, 0.1 mile west on a private road, and 200 feet south in a pasture.

5/ Location of the pedon: From the intersection of U.S. Highways 59 and 80 in Marshall, 8.4 miles north on U.S. Highway 59, about 2.1 miles west on Farm Road 1997, about 0.3 mile south on a county road, and 75 feet east in an area of woodland.

6/ Location of the pedon: From the intersection of U.S. Highways 59 and 80 in Marshall, 1.7 miles north on U.S. Highway 59, about 1.6 miles west on Loop 390, 2.0 miles north on a county road (2.3 miles north of Hillcrest Church), and 300 feet west in an area of woodland.

7/ Location of the pedon: From the intersection of U.S. Highways 59 and 80 in Marshall, 1.7 miles north on U.S. Highway 59, about 1.6 miles west on Loop 390, about 4.0 miles north on Farm Road 1997, about 1.7 miles west and 0.5 mile south on a county road, and 1.2 miles southwest on a private road, west of a highline.

8/ Analysis by Soil Mechanics Laboratory, Soil Conservation Service, Fort Worth, Texas.

9/ Location of the pedon sampled is the same as that of the pedon described as typical of series in the section "Soil Series and Their Morphology." This pedon has slightly less silt plus clay in the first horizon than is typical for the official series.

10/ Location of the pedon sampled is the same as that of the pedon described as typical of series in the section "Soil Series and Their Morphology." This pedon has slightly more silt in the surface layer than is typical for the official series.

11/ Location of the pedon: From the intersection of U.S. Highways 59 and 80 in Marshall, 1.5 miles south on U.S. Highway 59, about 11.1 miles southwest on Texas Highway 43, about 1.0 mile east and 1.1 miles south on a county road, and 100 feet east and 100 feet north in a pasture.

12/ Location of the pedon: From the intersection of U.S. Highways 59 and 80 in Marshall, 8.4 miles north on U.S. Highway 59, about 2.1 miles west on Farm Road 1997, about 0.3 mile south on a county road, and 200 feet southeast in an area of woodland.

13/ Location of the pedon sampled is the same as that of the pedon described as typical of series in the section "Soil Series and Their Morphology." This pedon has a slightly higher content of fine sand in surface layer than is typical for the official series.

14/ Location of the pedon: From the intersection of U.S. Highways 59 and 80 in Marshall, 2.9 miles north on U.S. Highway 59, about 1.5 miles west on Loop 390, about 2.3 miles north on a county road, 0.3 mile west on a private road, and 50 feet south in an area of woodland.

15/ Location of the pedon: From the intersection of U.S. Highways 59 and 80 in Marshall, 2.9 miles north on U.S. Highway 59, about 1.5 miles west on Loop 390, about 2.3 miles north on a county road, 0.2 mile west on a private road, and 500 feet west in a graded area.

16/ Location of the pedon: From the intersection of U.S. Highways 59 and 80 in Marshall, 0.5 mile south on U.S. Highway 59, about 15.8 miles southeast on Texas Highway 31, about 4.75 miles east on Farm Road 451, about 1.2 miles north on Farm Road 9, and 400 feet west in a pasture.

17/ Location of the pedon: From the intersection of U.S. Highways 59 and 80 in Marshall, 8.4 miles north on U.S. Highway 59, about 2.9 miles west on Farm Road 1997, about 1.1 miles south on a county road, and 0.3 mile west in a pasture.

18/ Location of the pedon: From the intersection of U.S. Highways 59 and 80 in Marshall, 0.5 mile south on U.S. Highway 59, about 15.8 miles southeast on Texas Highway 31, 4.75 miles east on Farm Road 451, about 1.2 miles north on Farm Road 9, and 400 feet west in pasture.

TABLE 24.--CLASSIFICATION OF THE SOILS

Soil name	Family or higher taxonomic class
Bernaldo	Fine-loamy, siliceous, thermic Glossic Paleudalfs
Bibb	Coarse-loamy, siliceous, acid, thermic Typic Fluvaquents
Bienville	Sandy, siliceous, thermic Psammentic Paleudalfs
Bonn	Fine-silty, mixed, thermic Glossic Natraqualfs
Bowie	Fine-loamy, siliceous, thermic Plinthic Paleudults
Cart	Coarse-loamy, siliceous, thermic Typic Fraglossudalfs
Cuthbert	Clayey, mixed, thermic Typic Hapludults
Cypress	Fine, mixed, acid, thermic Typic Fluvaquents
Darbonne	Fine-loamy, siliceous, thermic Typic Paleudalfs
Darco	Loamy, siliceous, thermic Grossarenic Paleudults
Darden	Thermic, coated Typic Quartzipsamments
Eastwood	Fine, montmorillonitic, thermic Vertic Hapludalfs
Elrose	Fine-loamy, siliceous, thermic Typic Paleudalfs
Erno	Fine-loamy, siliceous, thermic Typic Fragiudalfs
Estes	Fine, montmorillonitic, acid, thermic Aeric Fluvaquents
Guyton	Fine-silty, siliceous, thermic Typic Glossaqualfs
Iuka	Coarse-loamy, siliceous, acid, thermic Aquic Udifluvents
Kirvin	Clayey, mixed, thermic Typic Hapludults
Latch	Loamy, siliceous, thermic Grossarenic Paleudalfs
Latex	Fine-loamy, siliceous, thermic Glossic Paleudalfs
Lilbert	Loamy, siliceous, thermic Arenic Plinthic Paleudults
Maben	Fine, mixed, thermic Ultic Hapludalfs
Mantachie	Fine-loamy, siliceous, acid, thermic Aeric Fluvaquents
Marklake	Fine-loamy, siliceous, acid, thermic Alfic Udarents
Mathiston	Fine-silty, siliceous, acid, thermic Aeric Fluvaquents
Metcalf	Fine-silty, siliceous, thermic Aquic Glossudalfs
Meth	Fine, mixed, thermic Ultic Hapludalfs
Mollville	Fine-loamy, siliceous, thermic Typic Glossaqualfs
Mooreville	Fine-loamy, siliceous, thermic Fluvaquentic Dystrochrepts
Nugent	Sandy, siliceous, thermic Typic Udifluvents
Pickton	Loamy, siliceous, thermic Grossarenic Paleudalfs
Pirkey	Fine-loamy, siliceous, acid, thermic Ultic Udarents
Sacul	Clayey, mixed, thermic Aquic Hapludults
Sardis	Fine-silty, siliceous, thermic Fluvaquentic Dystrochrepts
Sawyer	Fine-silty, siliceous, thermic Aquic Paleudults
Scottsville	Fine-loamy over clayey, siliceous, thermic Glossaquic Paleudalfs
Socagee	Fine-silty, siliceous, acid, thermic Typic Fluvaquents
Warnock	Fine-loamy, siliceous, thermic Typic Paleudults
Wolfpen	Loamy, siliceous, thermic Arenic Paleudalfs

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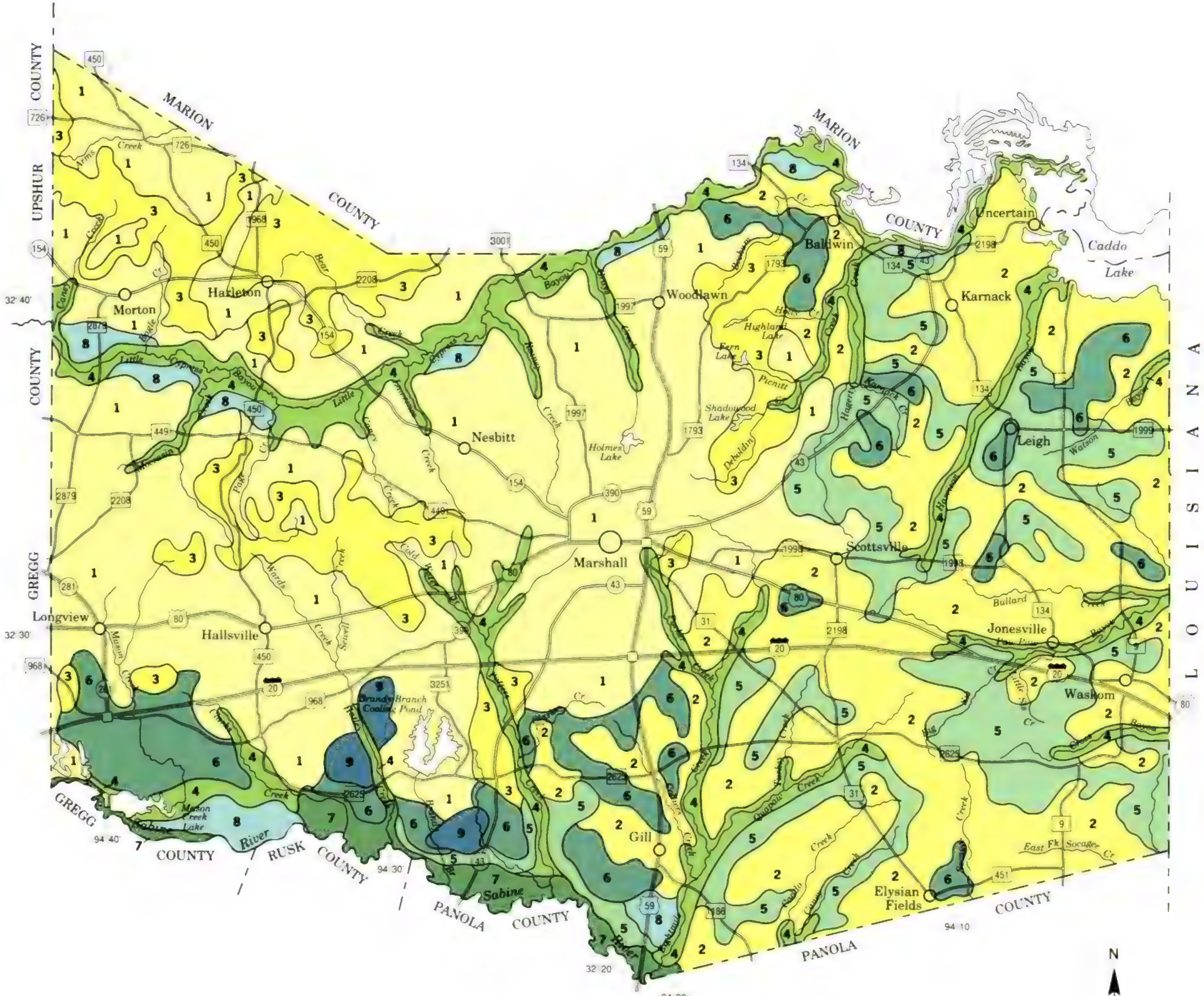
NRCS Accessibility Statement



SOIL LEGEND*

1	CUTHBERT-BOWIE-KIRVIN
2	SCOTTSVILLE
3	LILBERT-WARNOCK-WOLFPEN
4	IUKA-SOCAGEE-SARDIS
5	EASTWOOD
6	BERNALDO
7	ESTES-MOOREVILLE
8	LATCH-MOLLVILLE
9	PIRKEY-MARKLAKE

* The units on this legend are described in the text under the heading "General Soil Map Units."

Compiled 1989

Each area outlined on this map consists of more than one kind of soil. The map is thus meant for general planning rather than a basis for decisions on the use of specific tracts.

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
TEXAS AGRICULTURAL EXPERIMENT STATION

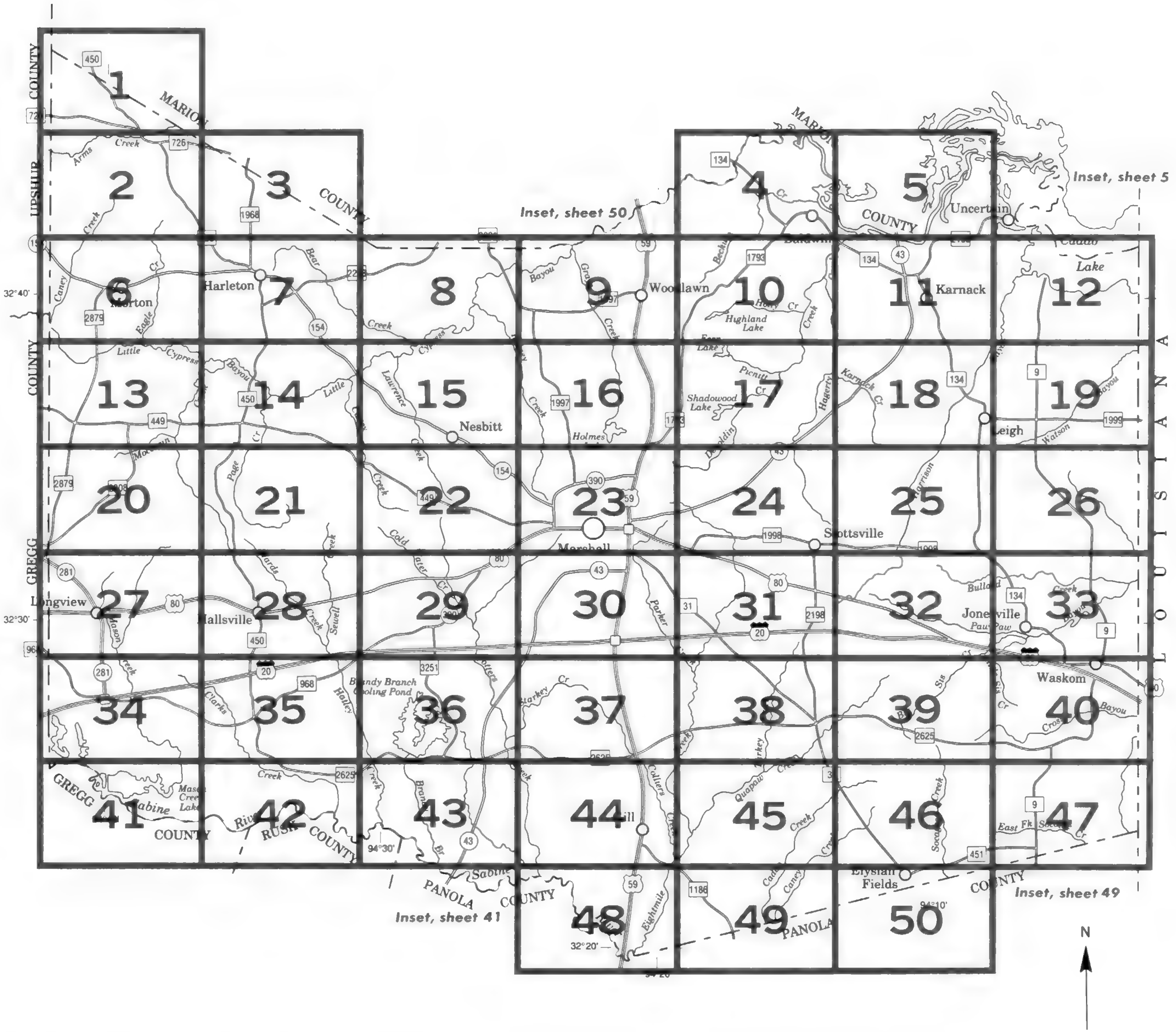
GENERAL SOIL MAP

HARRISON COUNTY, TEXAS

Scale 1:253,440

1 0 1 2 3 4 Mi

1 0 4 8 Km



INDEX TO MAP SHEETS

HARRISON COUNTY, TEXAS

Scale 1:253,440

1 0 1 2 3 4 Mi

1 0 4 8 Km

SOIL LEGEND

Map symbols consist of a combination of letters. The first capital letter is the initial one of the soil name. The second letter is a lowercase letter. The third letter, if used, is a capital letter and indicates the class of slope. Symbols without a slope letter are for nearly level soils or miscellaneous areas.

SYMBOL	NAME
BaB	Bernaldo fine sandy loam, 1 to 3 percent slopes
Bb	Bibb silt loam, frequently flooded
BeB	Bienville loamy fine sand, 1 to 3 percent slopes
BnA	Bonn-Cart complex, 0 to 1 percent slopes
BoC	Bowie very fine sandy loam, 2 to 5 percent slopes
CbE	Cuthbert fine sandy loam, 5 to 15 percent slopes
CgE	Cuthbert gravelly fine sandy loam, 5 to 15 percent slopes
CgF	Cuthbert gravelly fine sandy loam, 15 to 35 percent slopes
Cy	Cypress clay loam, submerged
DbC	Darbonne fine sandy loam, 3 to 5 percent slopes
DcC	Darco loamy fine sand, 2 to 5 percent slopes
DcE	Darco loamy fine sand, 8 to 15 percent slopes
DrC	Darden fine sand, 1 to 5 percent slopes
DrE	Darden fine sand, 5 to 15 percent slopes
EaC	Eastwood very fine sandy loam, 1 to 5 percent slopes
EaE	Eastwood very fine sandy loam, 5 to 20 percent slopes
EbB	Elrose fine sandy loam, 1 to 3 percent slopes
EcA	Erno-Cart complex, 0 to 2 percent slopes
Es	Estes clay, occasionally flooded
GcA	Guyton-Cart complex, 0 to 1 percent slopes
Iu	Iuka fine sandy loam, frequently flooded
KfC	Kirvin very fine sandy loam, 2 to 5 percent slopes
KgC	Kirvin gravelly fine sandy loam, 2 to 5 percent slopes
KsC	Kirvin soils, graded, 2 to 8 percent slopes
LaA	Latch-Mollville complex, 0 to 1 percent slopes
LeB	Latex fine sandy loam, 1 to 3 percent slopes
LtC	Lilbert loamy fine sand, 2 to 5 percent slopes
MaG	Maben very fine sandy loam, 20 to 40 percent slopes
MbB	Marklake fine sandy loam, 1 to 3 percent slopes
MbC	Marklake fine sandy loam, 3 to 5 percent slopes
MbE	Marklake sandy clay loam, 12 to 20 percent slopes
McA	Metcalf-Cart complex, 0 to 2 percent slopes
MeB	Meth fine sandy loam, 1 to 3 percent slopes
Mm	Mooreville-Mantachie complex, frequently flooded
Nu	Nugent loam, frequently flooded
PkC	Pickton loamy fine sand, 2 to 5 percent slopes
PkE	Pickton loamy fine sand, 8 to 15 percent slopes
PrB	Pirkey very fine sandy loam, 1 to 3 percent slopes
PrC	Pirkey very fine sandy loam, 3 to 5 percent slopes
PrE	Pirkey very fine sandy loam, 8 to 12 percent slopes
Pt	Pits and Dumps
SaC	Sacul very fine sandy loam, 1 to 5 percent slopes
Sm	Sardis-Mathiston complex, frequently flooded
SrA	Sawyer very fine sandy loam, 0 to 2 percent slopes
SvA	Scottsville very fine sandy loam, 0 to 2 percent slopes
Sz	Socagee silty clay loam, frequently flooded
Ur	Urban land
WaE	Warnock loamy fine sand, 8 to 15 percent slopes
WoC	Wolfpen loamy fine sand, 2 to 5 percent slopes
WoE	Wolfpen loamy fine sand, 8 to 15 percent slopes

CONVENTIONAL AND SPECIAL SYMBOLS LEGEND

CULTURAL FEATURES

BOUNDARIES

- National, state, or province
- County or parish
- Minor civil division
- Reservation (national forest or park, state forest or park, and large airport)
- Land grant
- Limit of soil survey (label)
- Field sheet matchline and neatline

AD HOC BOUNDARY (label)

- Small airport, airfield, park, oilfield, cemetery, or flood pool

STATE COORDINATE TICK
1 890 000 FEET

LAND DIVISION CORNER
(sections and land grants)

ROADS

- Divided (median shown if scale permits)
- Other roads
- Trail

ROAD EMBLEM & DESIGNATIONS

- Interstate
- Federal
- State
- County, farm or ranch

RAILROAD

POWER TRANSMISSION LINE
(normally not shown)

PIPE LINE (normally not shown)

FENCE (normally not shown)

LEVEES

- Without road
- With road
- With railroad

DAMS

- Large (to scale)
- Medium or Small

PITS

- Gravel pit
- Mine or quarry

MISCELLANEOUS CULTURAL FEATURES

- Farmstead, house (omit in urban area)
- Church
- School
- Indian mound (label)
- Located object (label)
- Tank (label)
- Wells, oil or gas
- Windmill
- Kitchen midden

WATER FEATURES

DRAINAGE

- Perennial, double line
- Perennial, single line
- Intermittent
- Drainage end
- Canals or ditches
  - Double-line (label)
  - Drainage and/or irrigation

LAKES, PONDS AND RESERVOIRS

- Perennial
- Intermittent

MISCELLANEOUS WATER FEATURES

- Marsh or swamp
- Spring
- Well, artesian
- Well, irrigation
- Wet spot

SPECIAL SYMBOLS FOR SOIL SURVEY

SOIL DELINEATIONS AND SYMBOLS

ESCARPMENTS

- Bedrock (points down slope)
- Other than bedrock (points down slope)

SHORT STEEP SLOPE

GULLY

DEPRESSION OR SINK

SOIL SAMPLE (normally not shown)

MISCELLANEOUS

- Blowout
- Clay spot
- Gravelly spot
- Gumbo, slick or scabby spot (sodic)
- Dumps and other similar non soil areas
- Prominent hill or peak
- Rock outcrop (includes sandstone and shale)
- Saline spot
- Sandy spot
- Severely eroded spot
- Slide or slip (tips point upslope)
- Stony spot, very stony spot

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1978 - 1979 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

HARRISON COUNTY, TEXAS NO. 1

1

N

Scale - 1:24000

2

N

Scale 1:24000

10 000 Feet

3 Kilometers

HARRISON COUNTY, TEXAS NO. 2

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3

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HARRISON COUNTY, TEXAS NO. 3

N

Scale - 1:24000

10000 Feet

3 Kilometers

HARRISON COUNTY, TEXAS NO. 4

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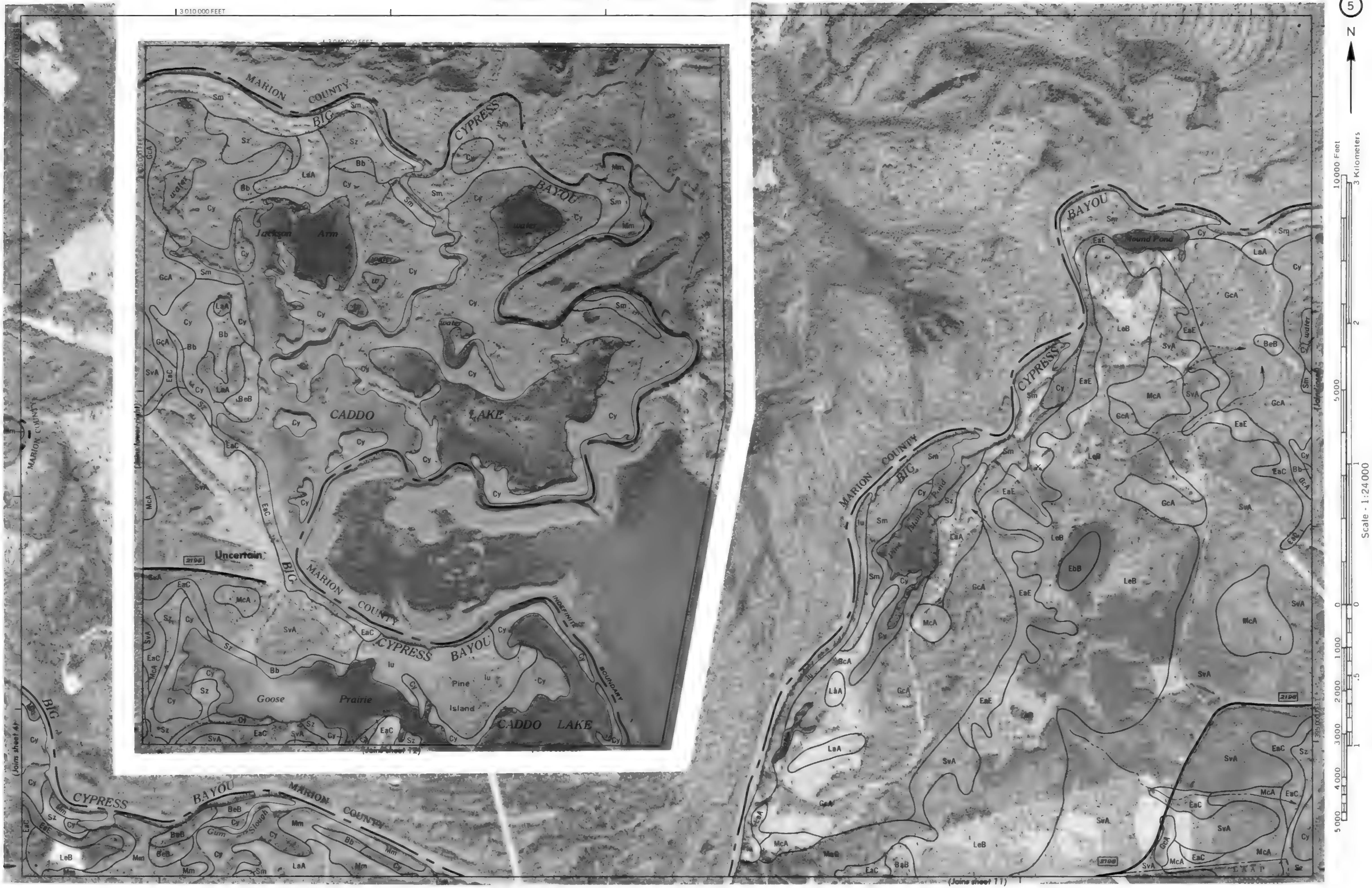

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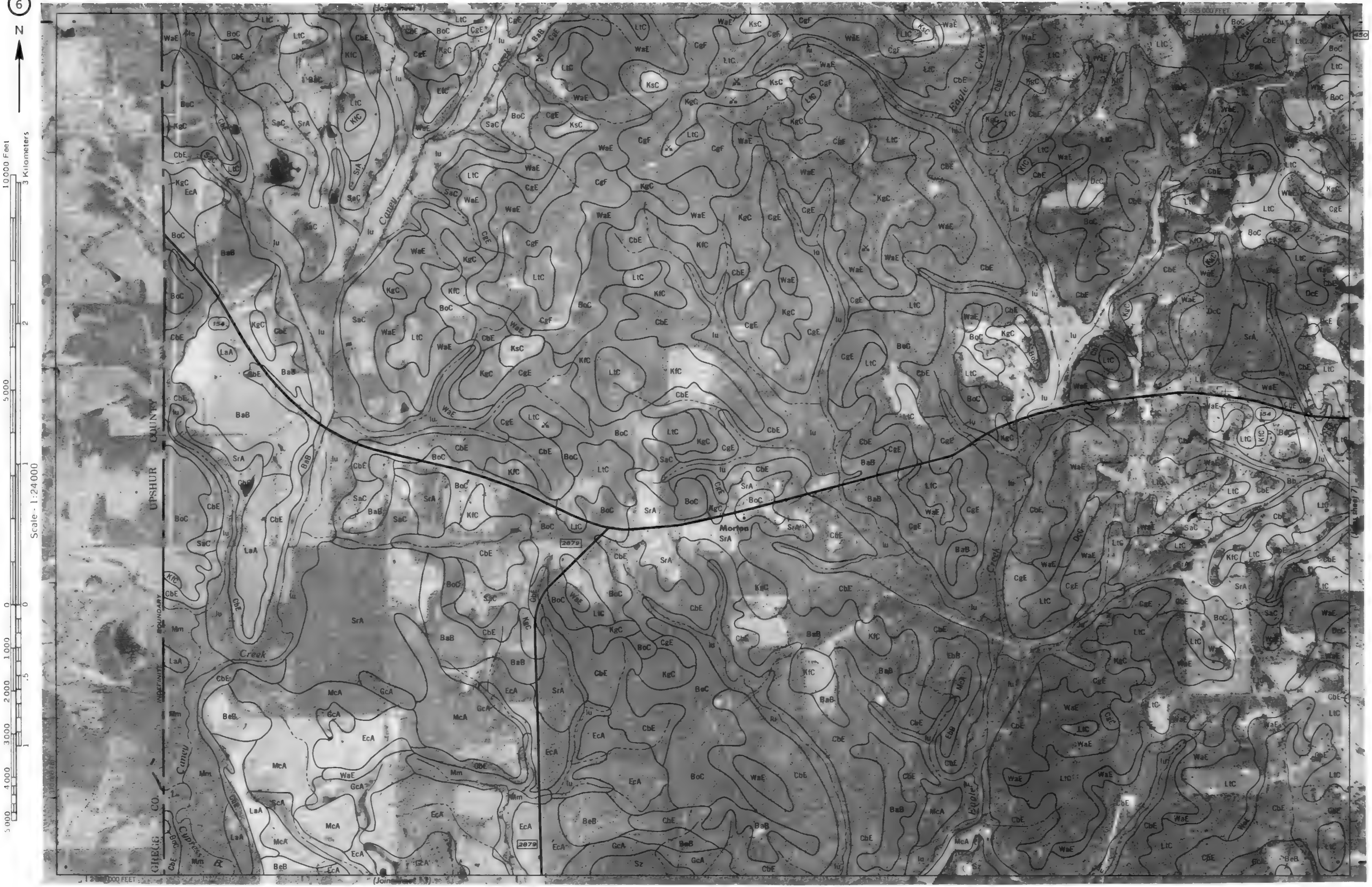
HARRISON COUNTY, TEXAS NO. 5

6



HARRISON COUNTY, TEXAS NO. 6

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7

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1978 - 1979 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

HARRISON COUNTY, TEXAS NO. 7

HARRISON COUNTY, TEXAS NO. 8

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HARRISON COUNTY, TEXAS NO. 9

HARRISON COUNTY, TEXAS NO. 10

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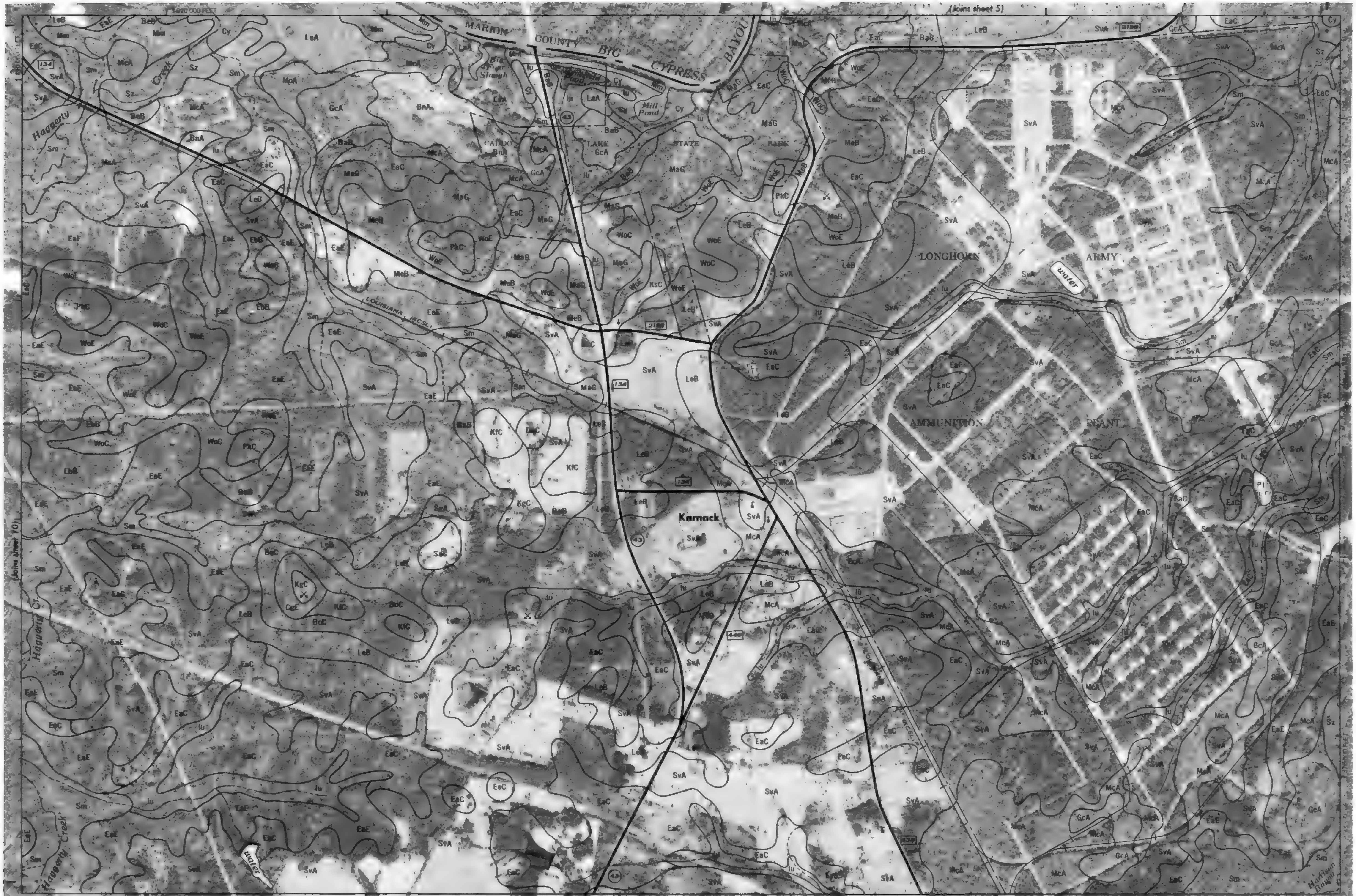

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HARRISON COUNTY, TEXAS NO. 11

11

N

Scale - 1:24000

10000 Feet · 5000 · 1000 · 0 · 1000 · 2000 · 3000 · 4000 · 5000

3 Kilometers · 2 · 1 · .5 · 0

HARRISON COUNTY, TEXAS NO. 12

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HARRISON COUNTY, TEXAS NO. 13

HARRISON COUNTY, TEXAS NO. 14

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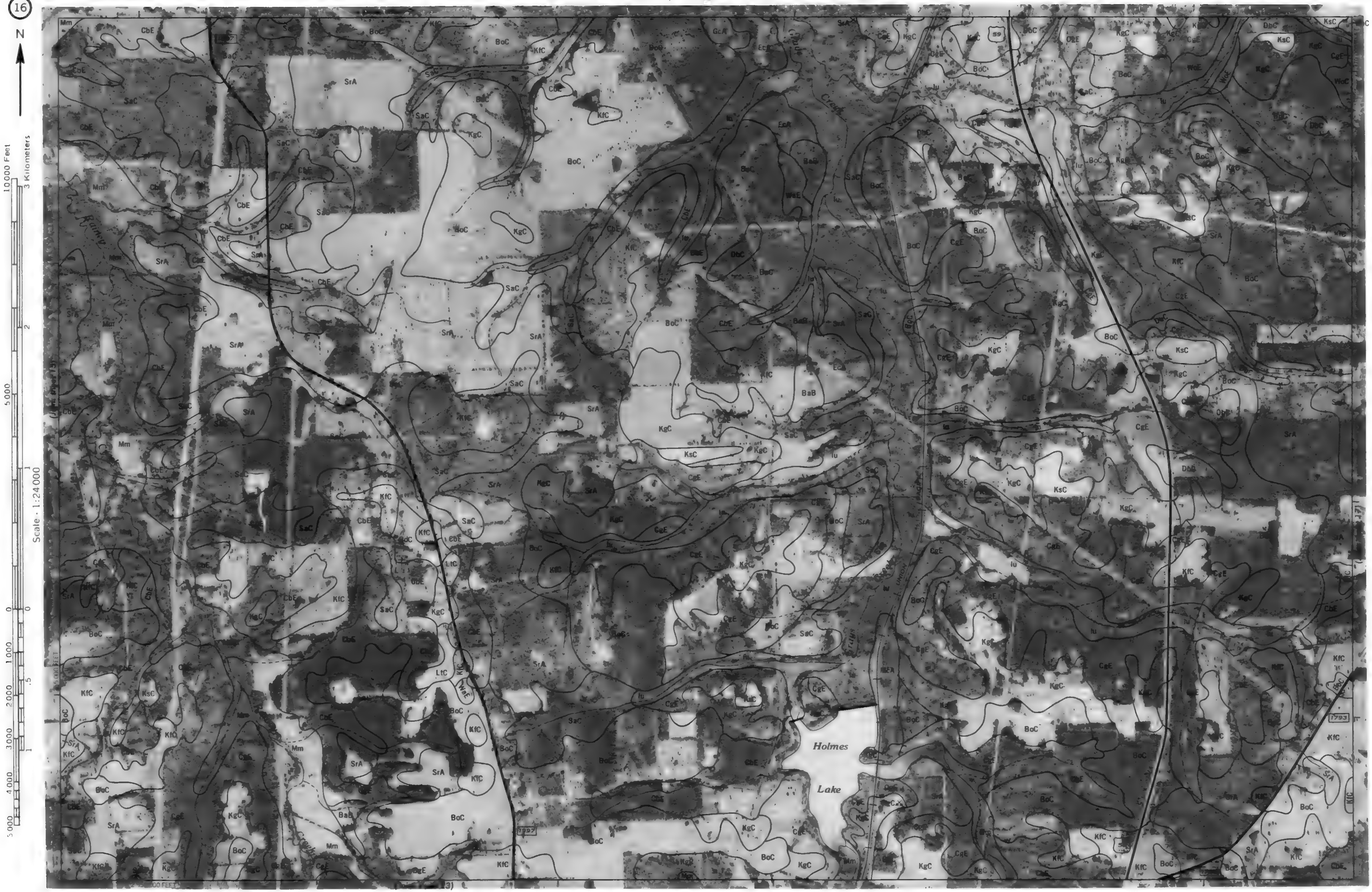
HARRISON COUNTY, TEXAS NO. 15



HARRISON COUNTY, TEXAS NO. 16

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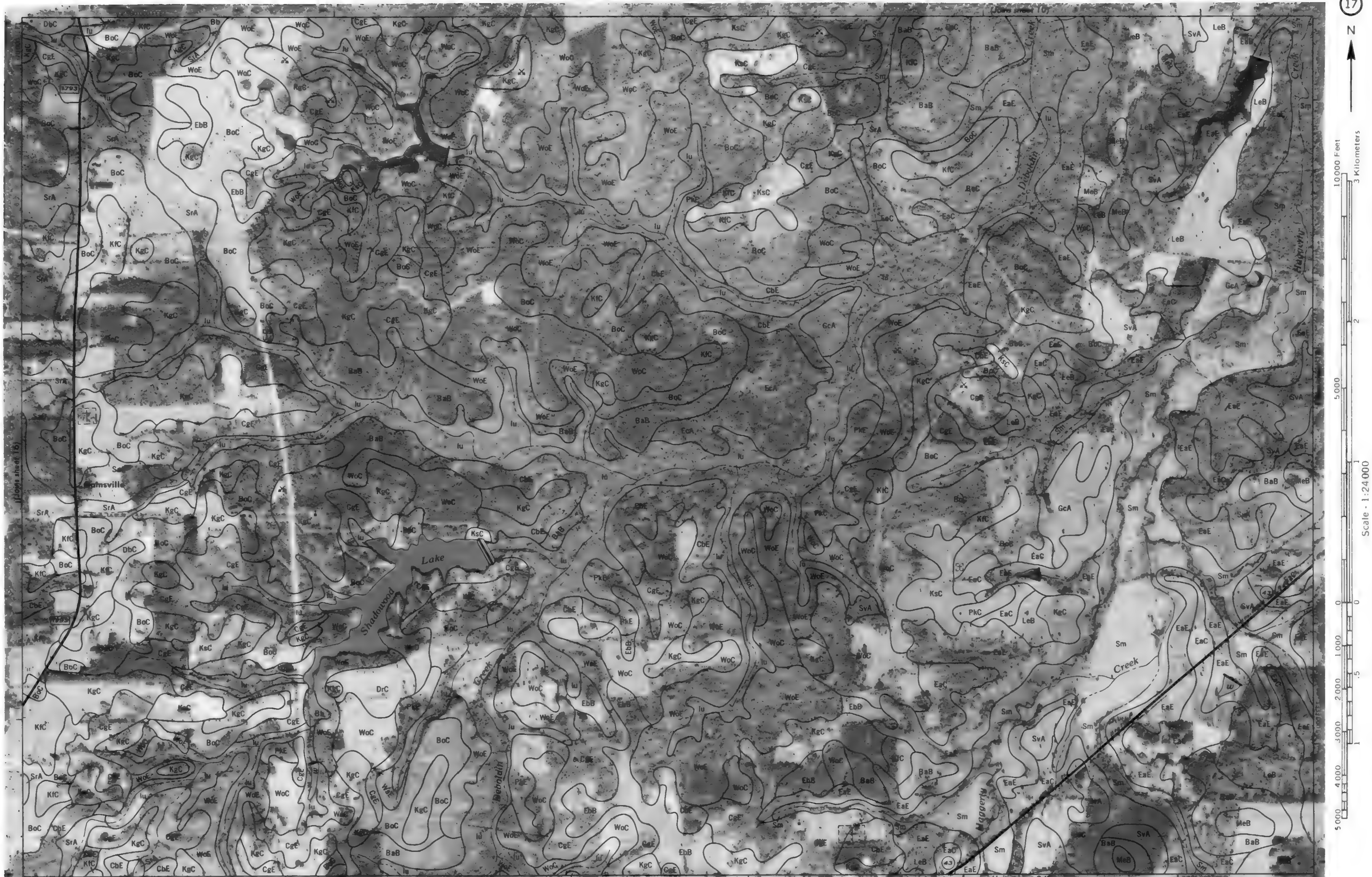

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HARRISON COUNTY, TEXAS NO. 17

HARRISON COUNTY, TEXAS NO. 18

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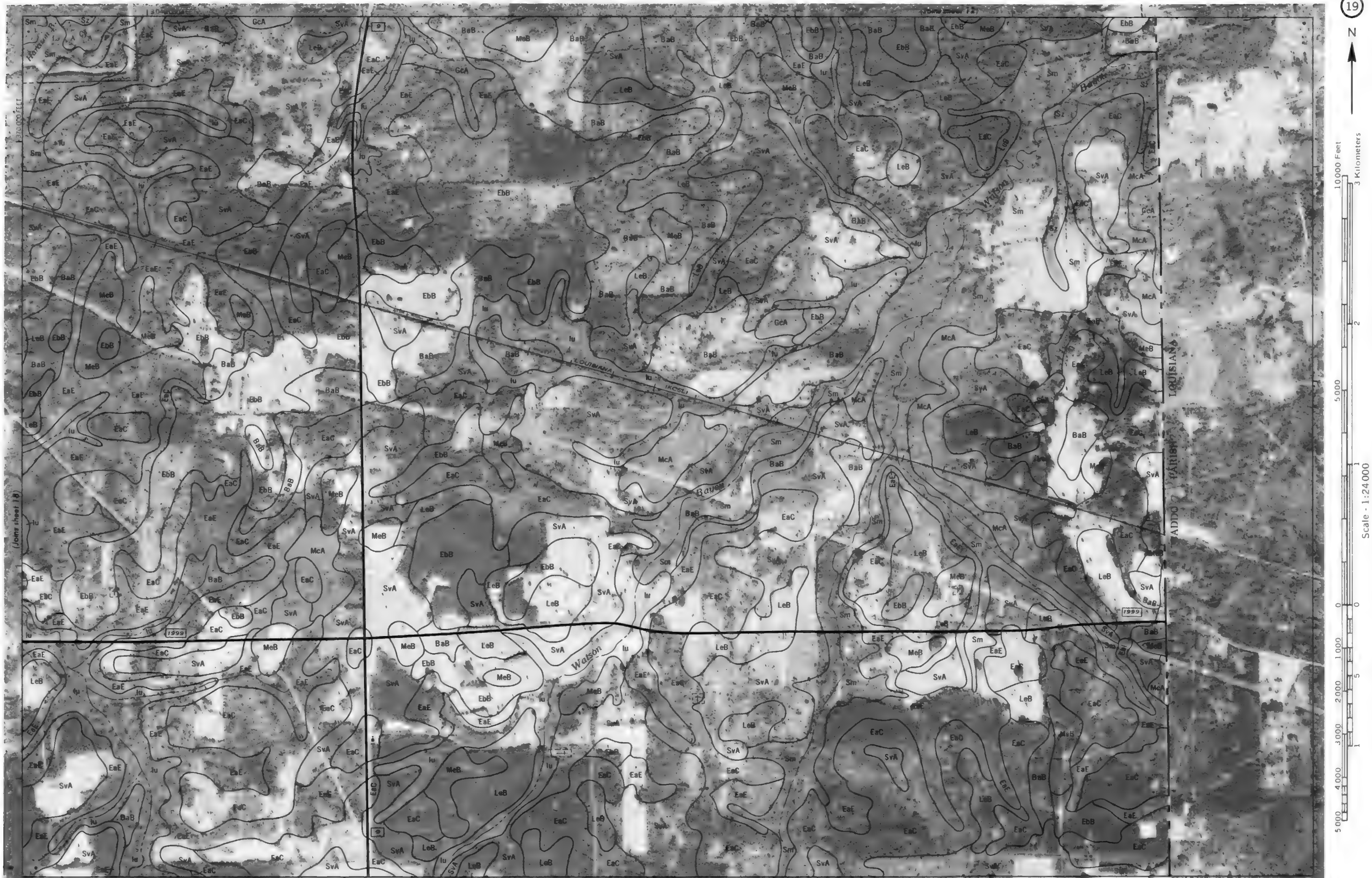

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HARRISON COUNTY, TEXAS NO. 19

HARRISON COUNTY, TEXAS NO. 20

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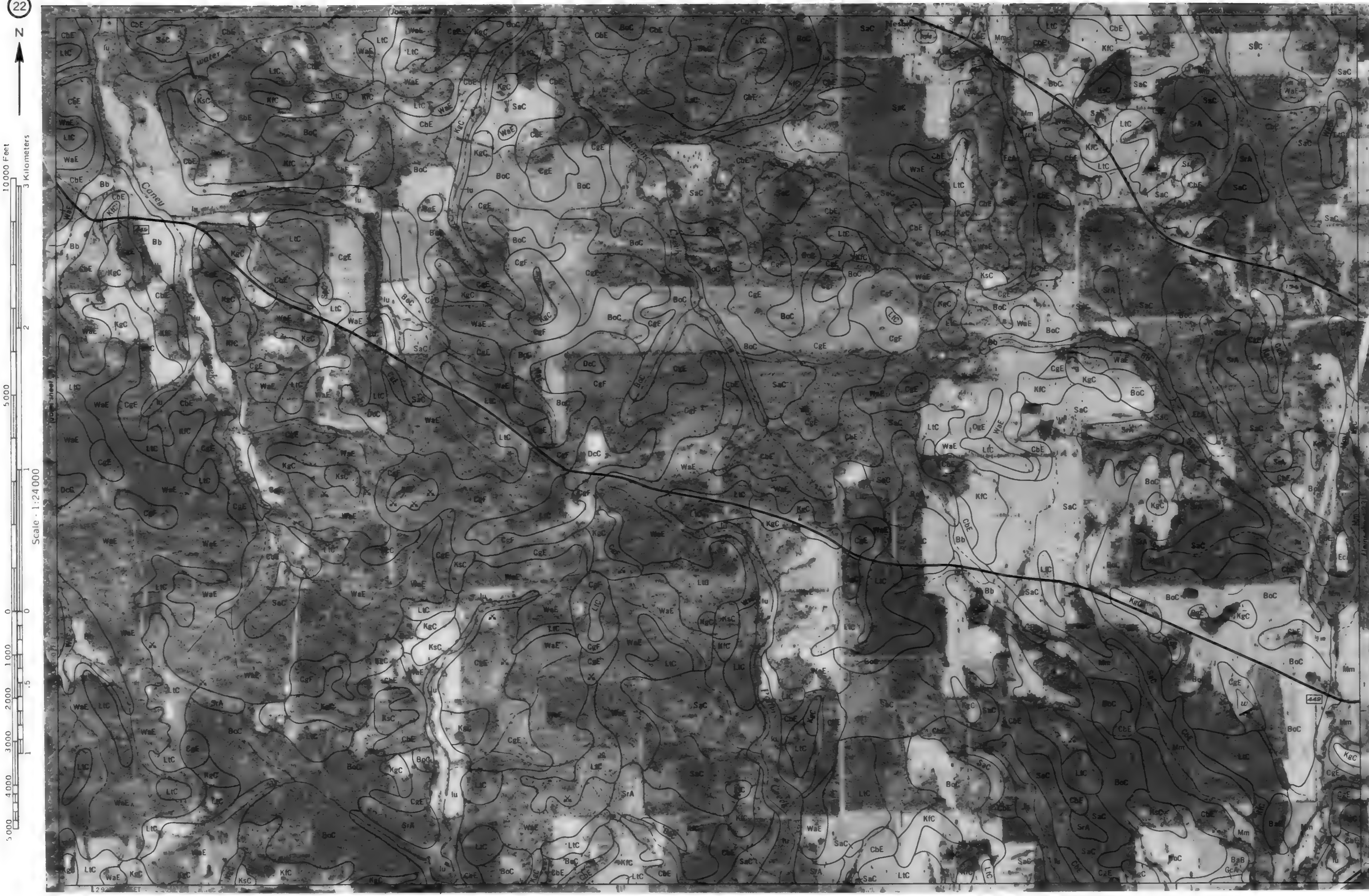
HARRISON COUNTY, TEXAS NO. 21



HARRISON COUNTY, TEXAS NO. 22

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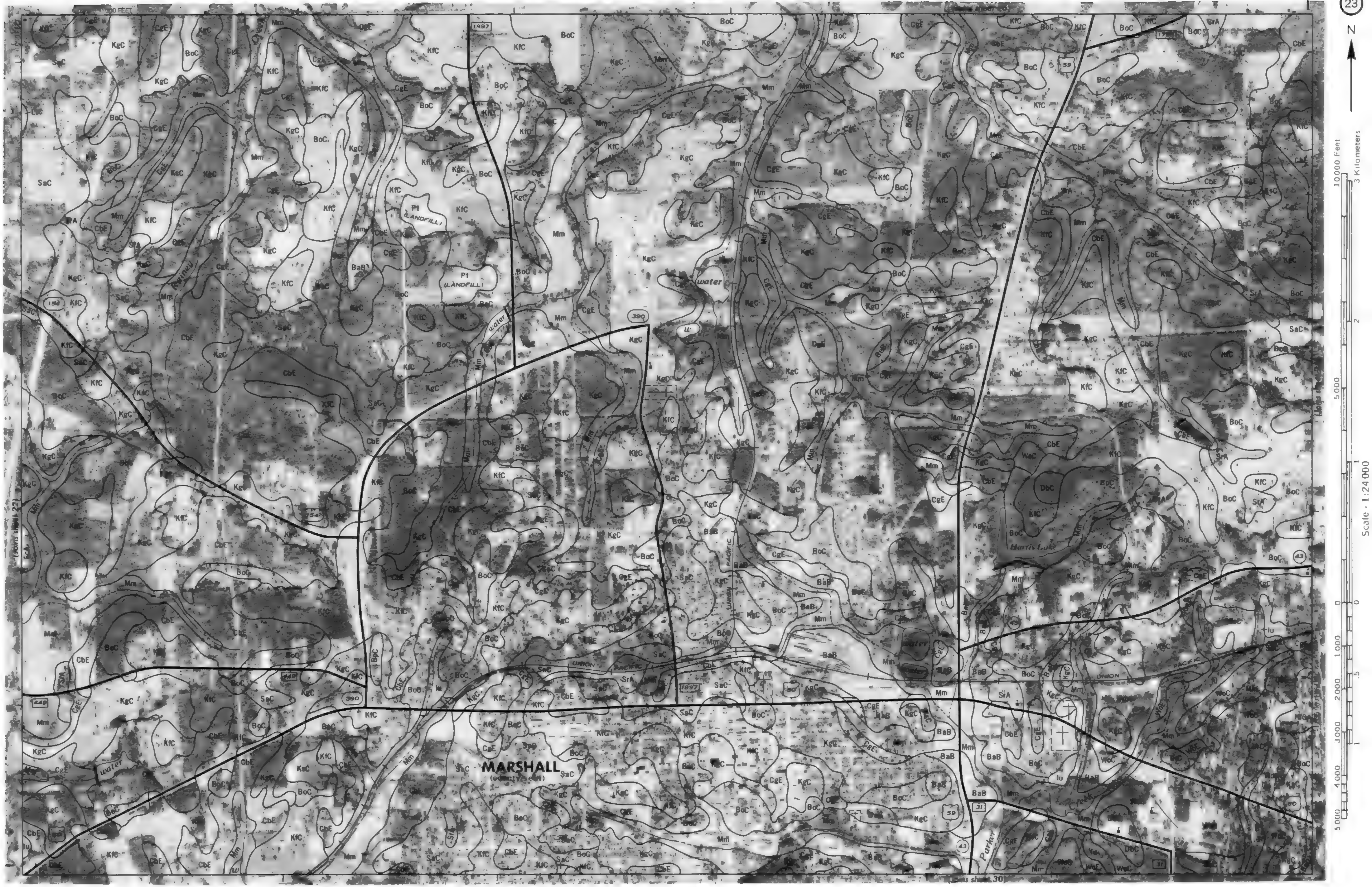

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HARRISON COUNTY, TEXAS NO. 23

HARRISON COUNTY, TEXAS NO. 24

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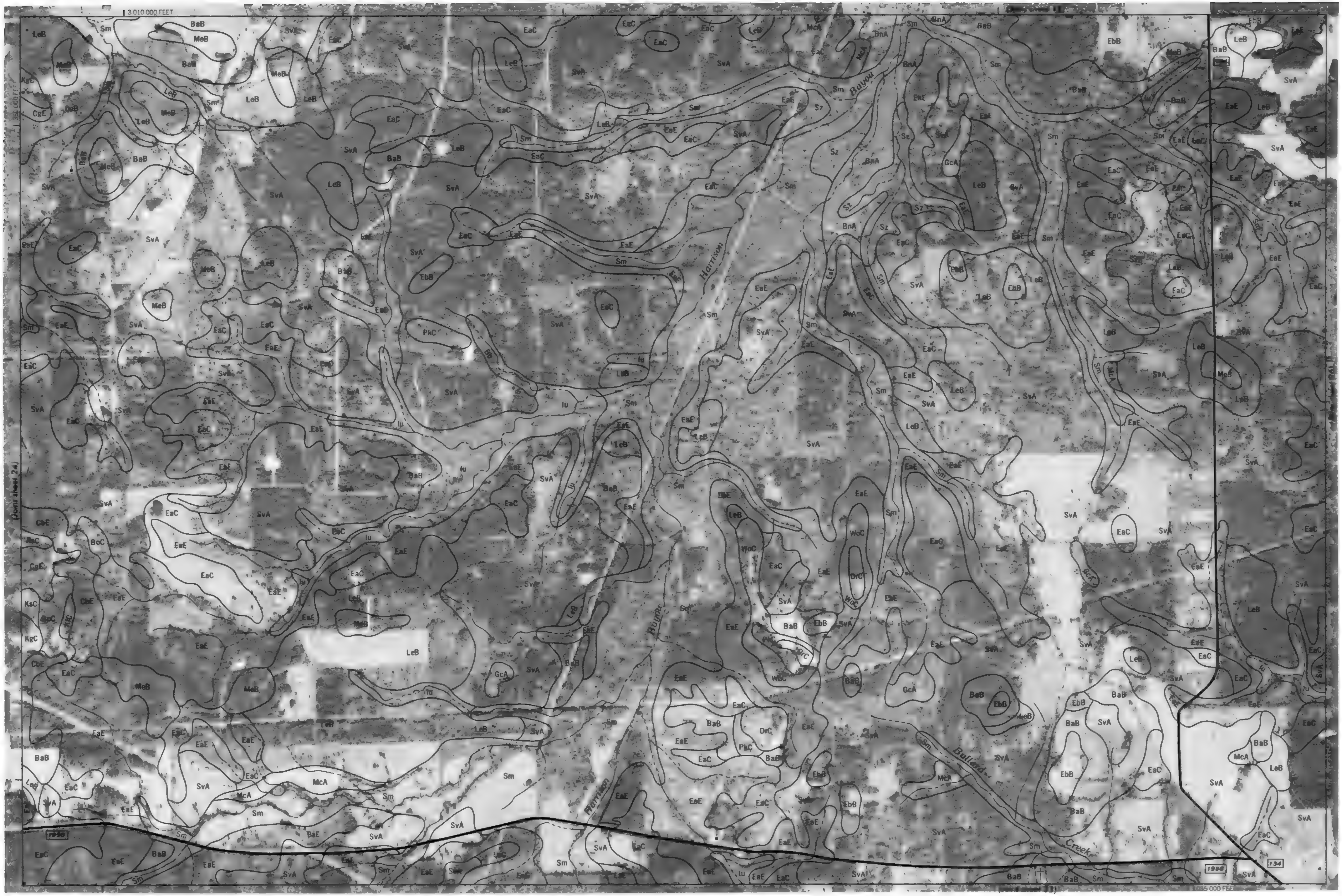
HARRISON COUNTY, TEXAS NO. 25



25

N

Scale - 1:24000

10000 Feet

3 Kilometers

HARRISON COUNTY, TEXAS NO. 26

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HARRISON COUNTY, TEXAS NO. 27

27

N

10 000 Feet
3 Kilometers
Scale - 1:24 000

HARRISON COUNTY, TEXAS NO. 28

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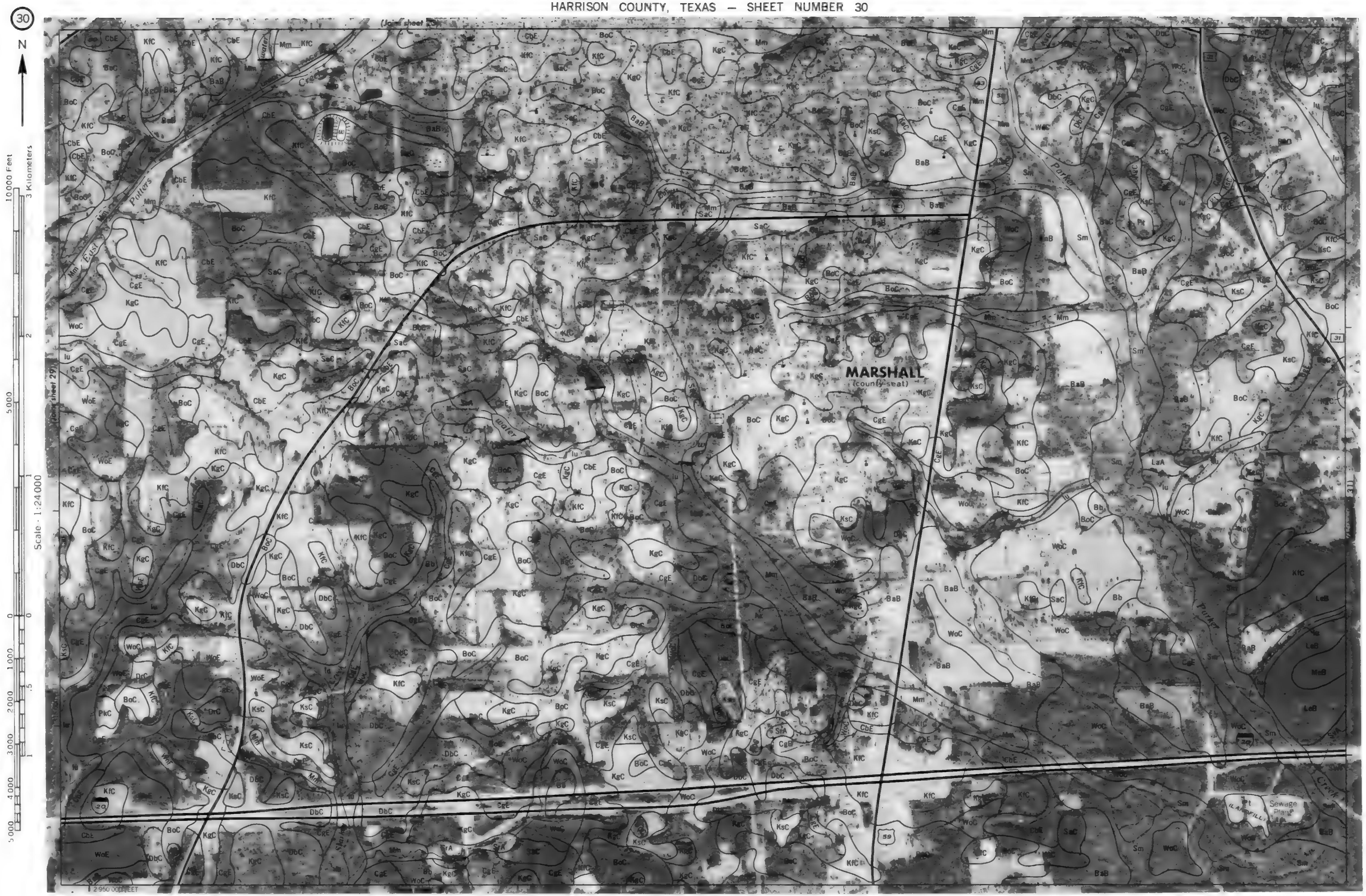
HARRISON COUNTY, TEXAS NO. 29



HARRISON COUNTY, TEXAS NO. 30

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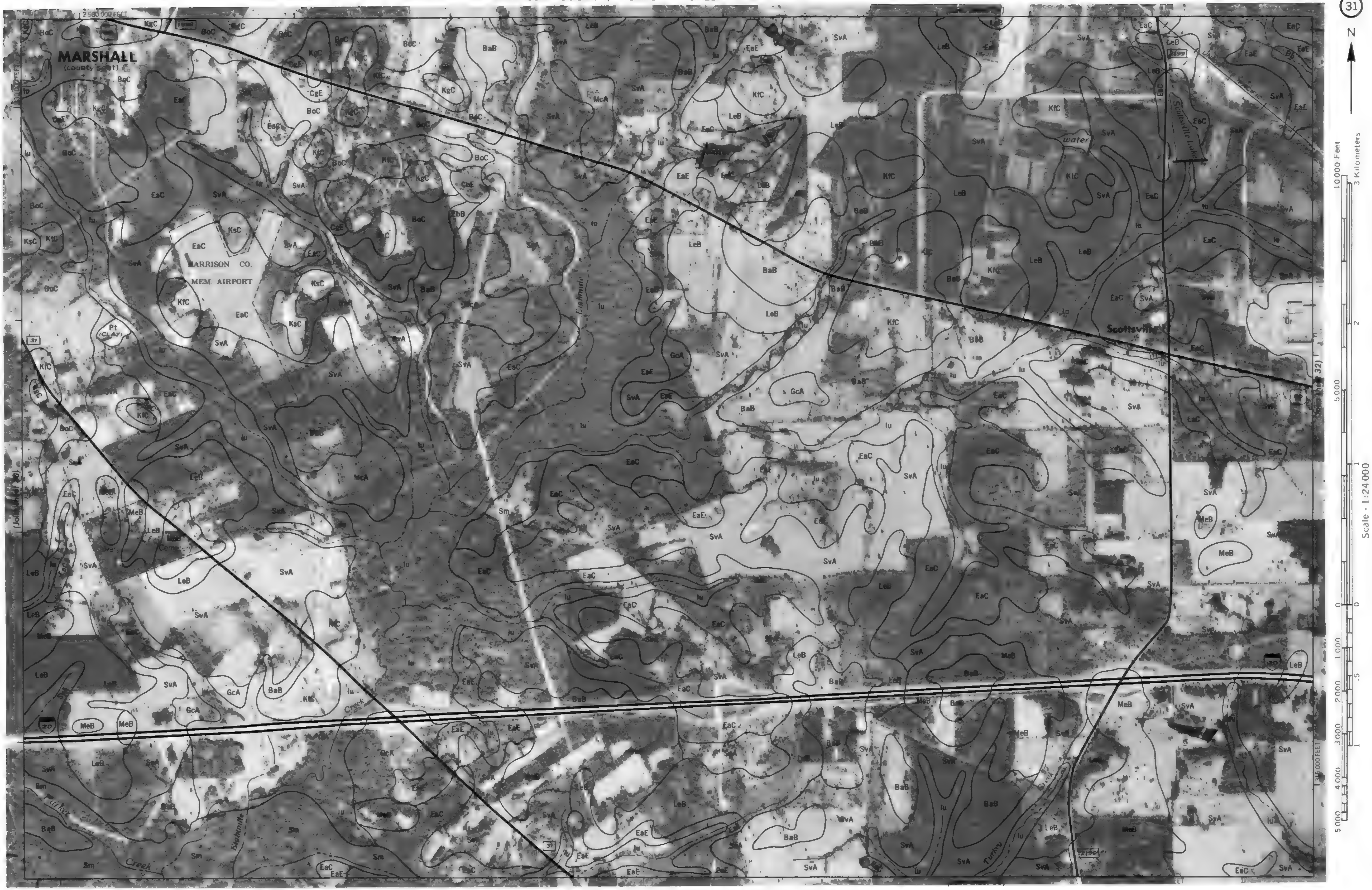

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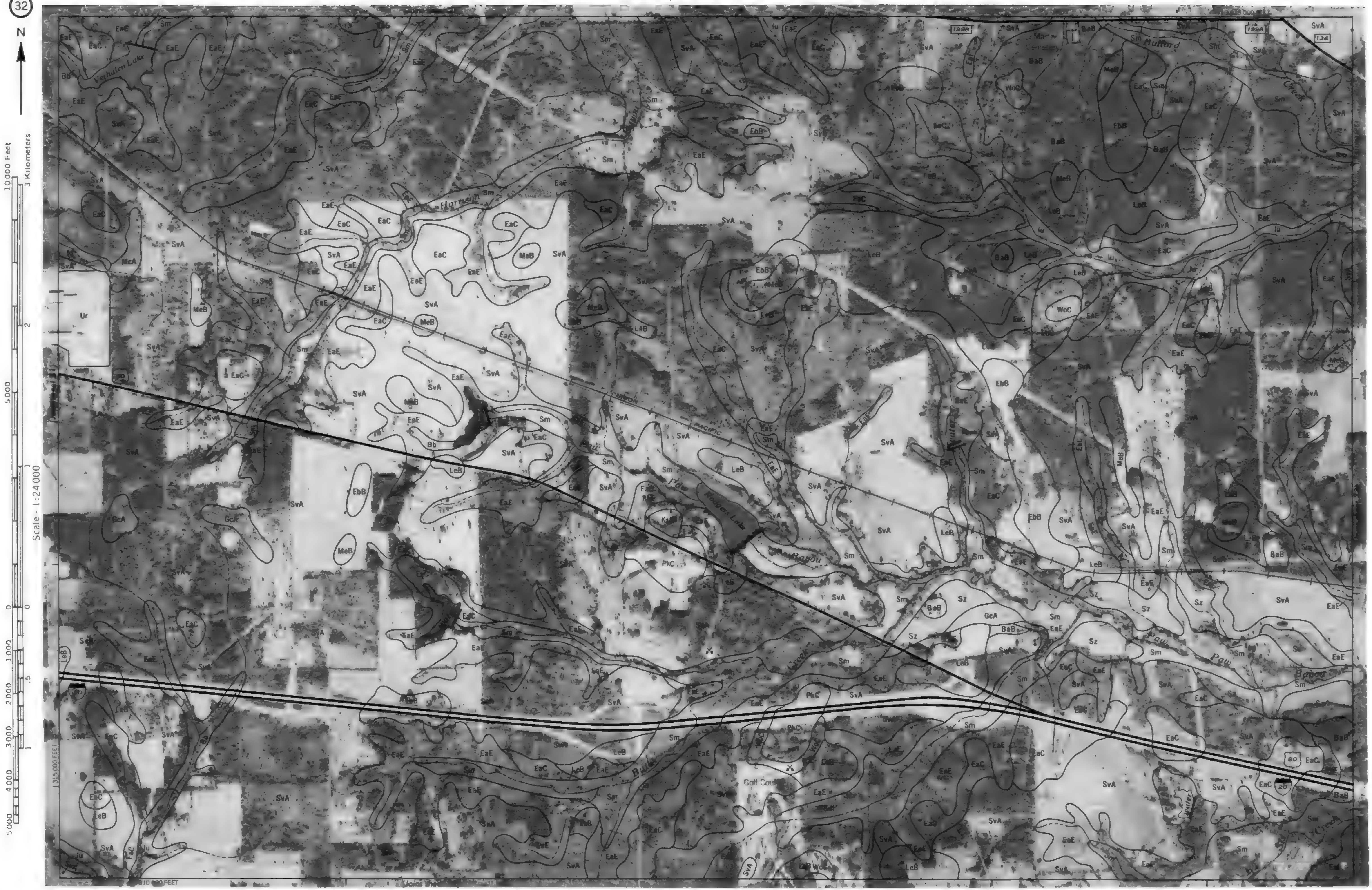
HARRISON COUNTY, TEXAS NO. 31



HARRISON COUNTY, TEXAS NO. 32

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1978 - 1979 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

33

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HARRISON COUNTY, TEXAS NO. 33

N

10 000 Feet
3 Kilometers

Scale - 1:24 000

HARRISON COUNTY, TEXAS NO. 34

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1978-1979 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

35

N

10 000 Feet
3 Kilometers
Scale 1:24 000

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1978-1979 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

HARRISON COUNTY, TEXAS NO. 35

HARRISON COUNTY, TEXAS NO. 36

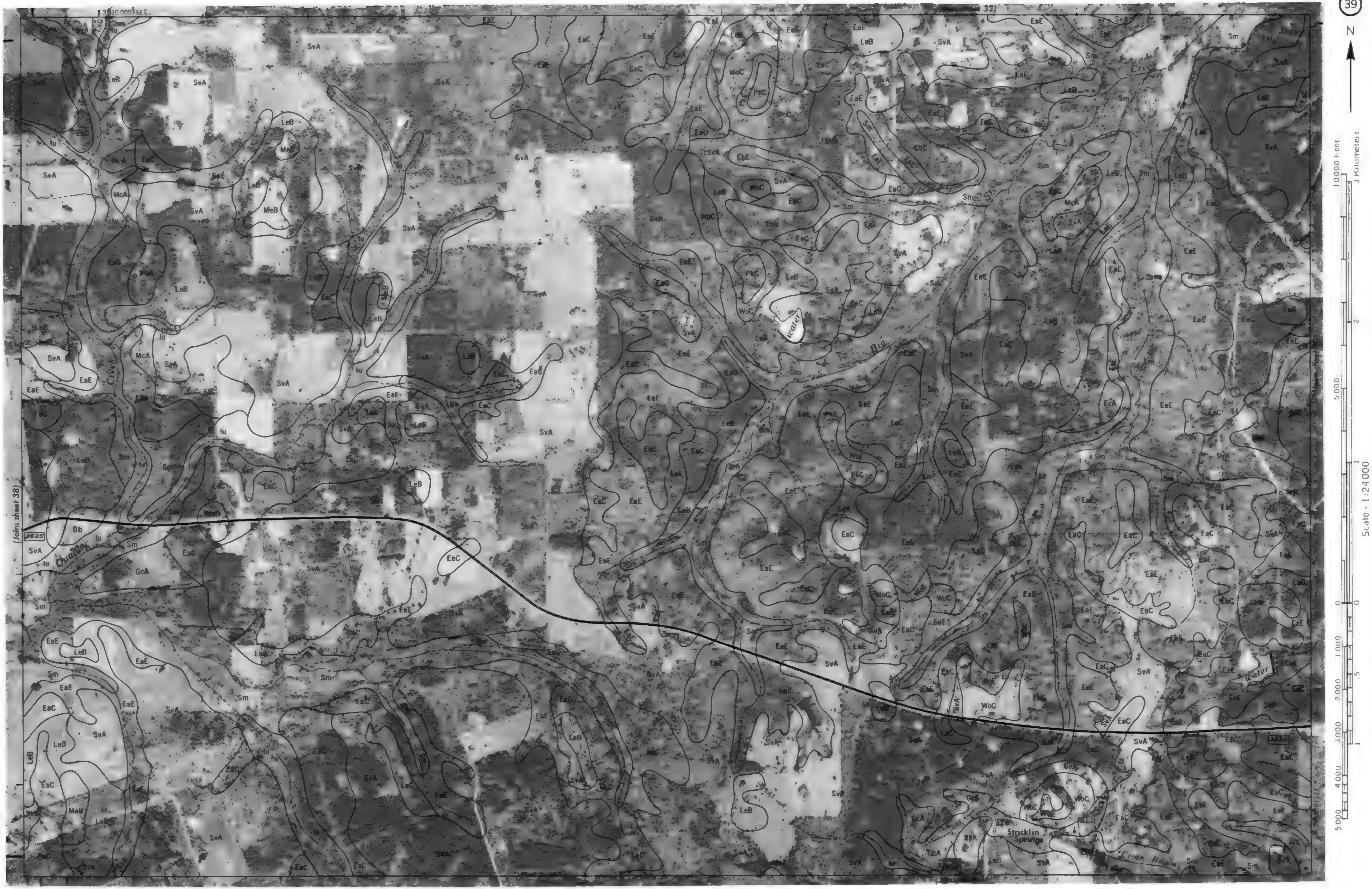
This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1978-1979 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1975 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

HARRISON COUNTY, TEXAS NO. 37

HARRISON COUNTY, TEXAS NO. 38

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1978-1979 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1978 - 1979 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

HARRISON COUNTY, TEXAS NO. 39

40

N

Scale 1:24 000

10 000 Feet

3 Kilometers

HARRISON COUNTY, TEXAS NO. 40

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1978-1979 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

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HARRISON COUNTY, TEXAS NO. 41

HARRISON COUNTY, TEXAS NO. 42

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1978-1979 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

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HARRISON COUNTY, TEXAS NO. 43

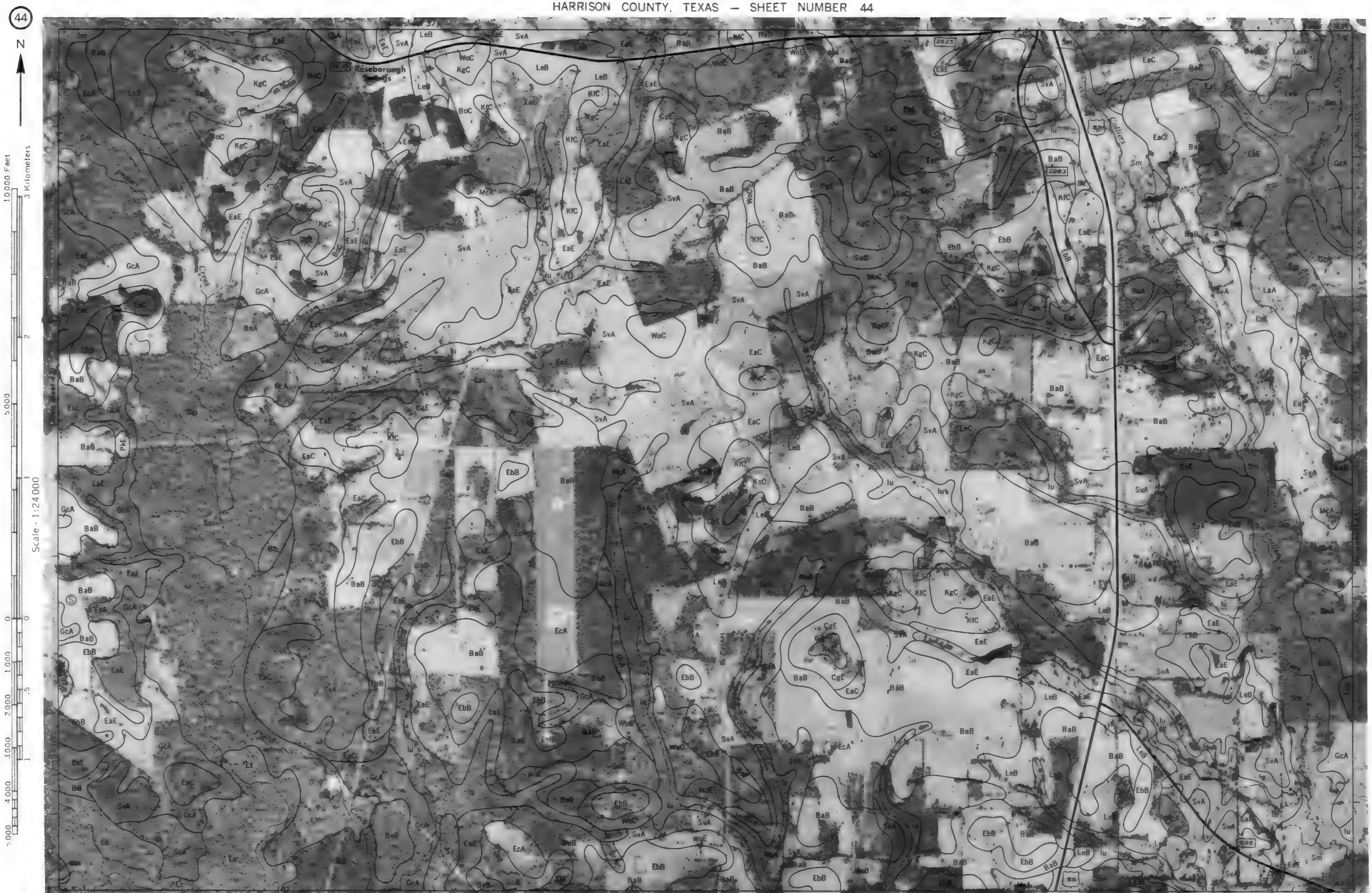
43

N

10 000 Feet

3 Kilometers

Scale - 1:24 000



HARRISON COUNTY, TEXAS NO. 44

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1978 - 1979 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

45

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1978-1979 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

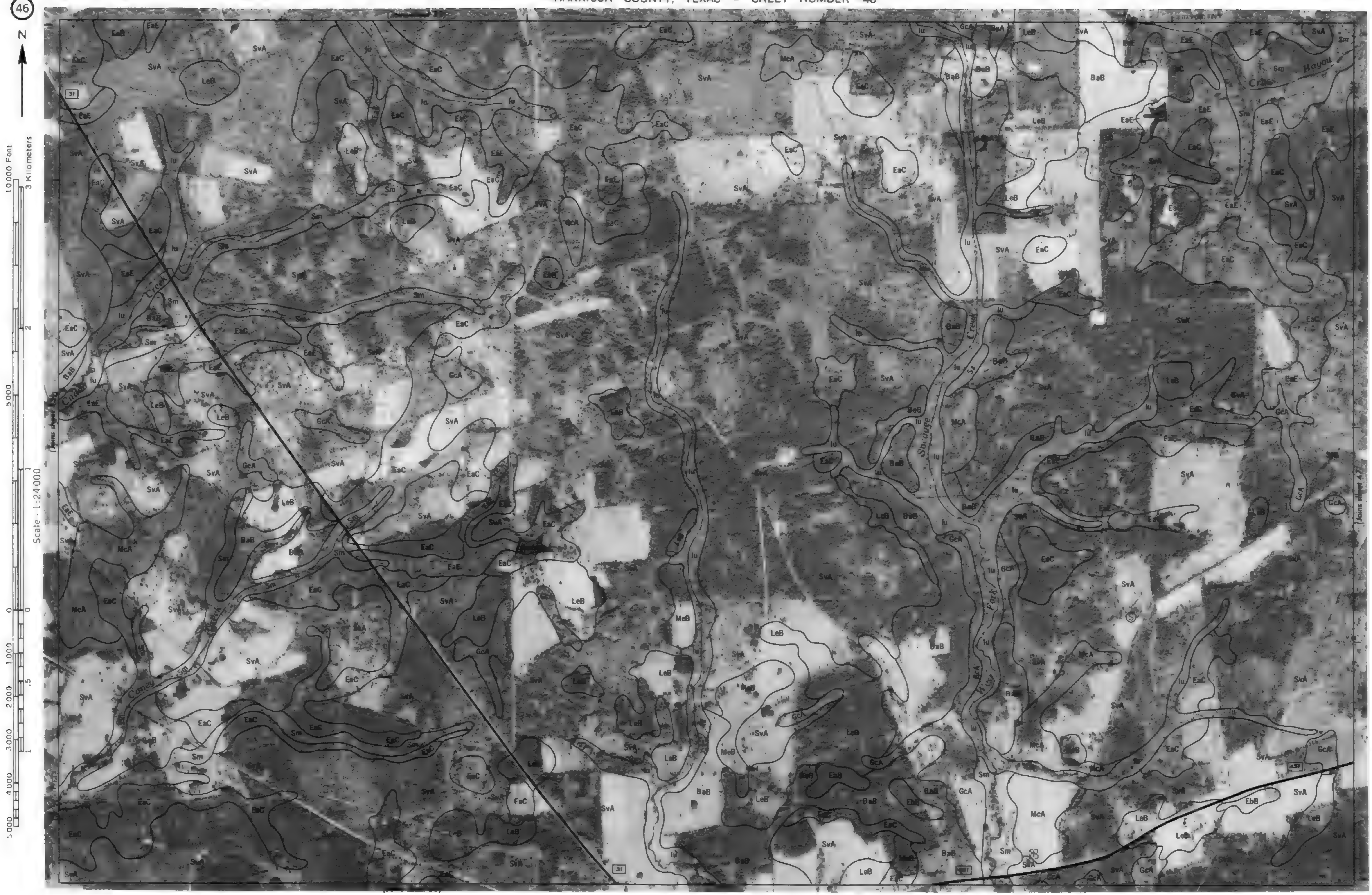
HARRISON COUNTY, TEXAS NO. 45

N

10 000 Feet

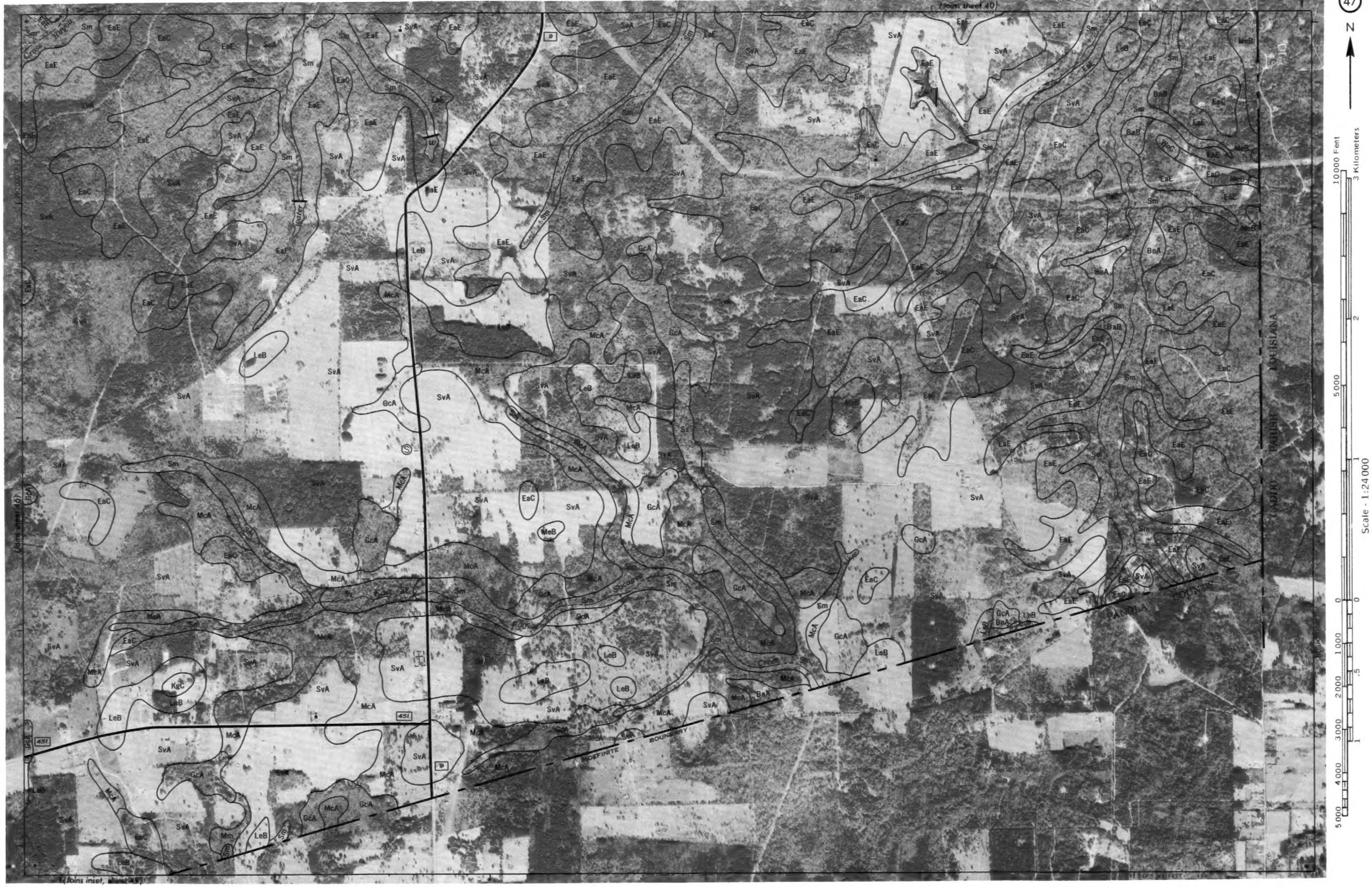
3 Kilometers

Scale - 1:24 000



HARRISON COUNTY, TEXAS NO. 46

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1978-1979 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

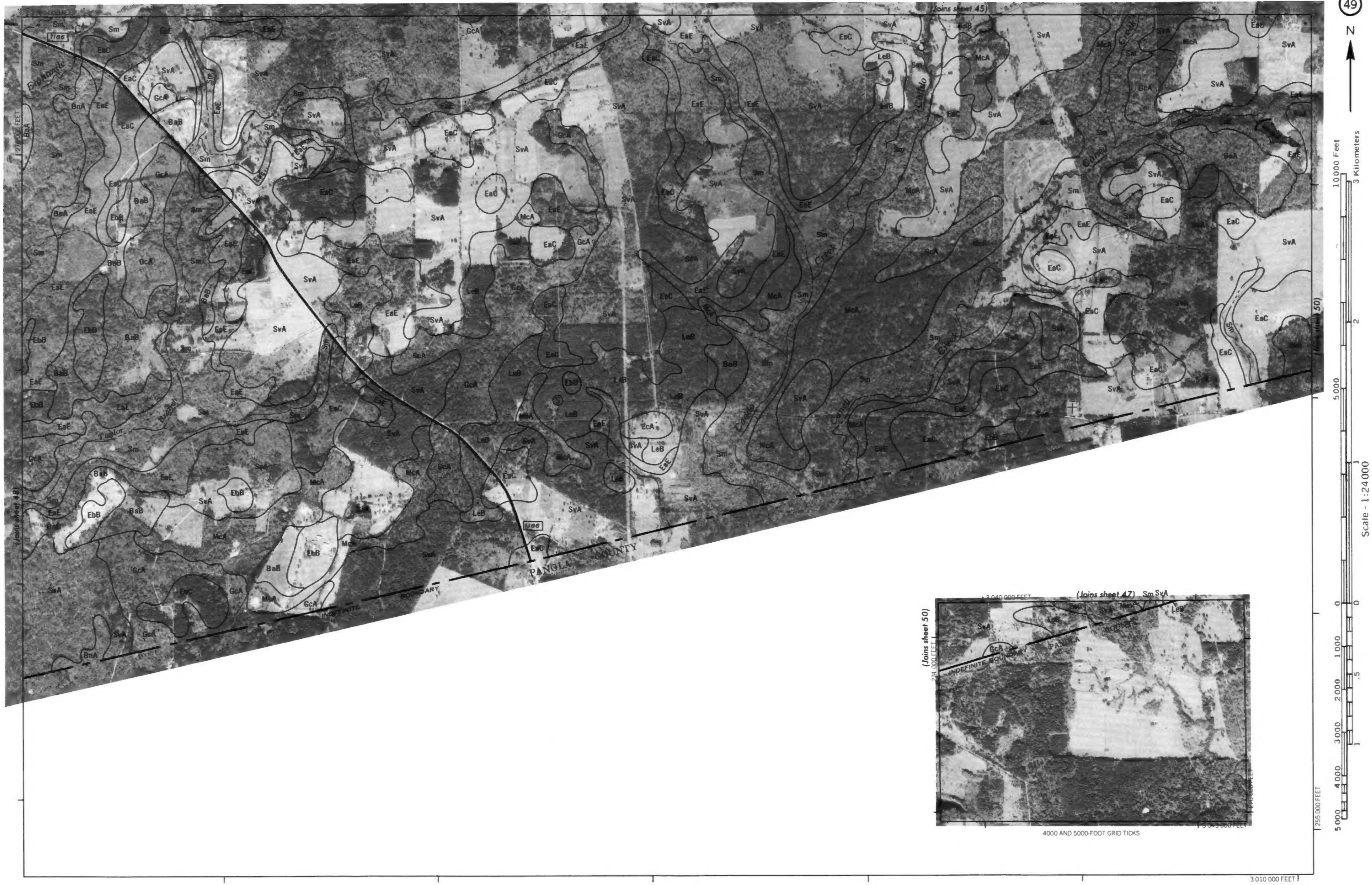


This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1978 - 1979 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

HARRISON COUNTY, TEXAS NO. 47

HARRISON COUNTY, TEXAS NO. 48

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1978 -1979 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1978 - 1979 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

HARRISON COUNTY, TEXAS NO. 49

49

HARRISON COUNTY, TEXAS — SHEET NUMBER 50

HARRISON COUNTY, TEXAS NO. 50

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1978 - 1979 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.